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STA SURVEY REPORT ON RESEARCH ACTIVITIES BY PRIVATE CORPORATIONS

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STA Survey Report on Research Activities by Private Corporations

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[Text] Foreword

In order for Japan to establish a base for socio-economic development and to fulfil an international role befitting its position, it must strive for a higher level of advancement in science and technology. Gathering and analyzing various kinds of data related to S&T is essential in the creation and promotion of such S&T policies.

In order to obtain the various materials needed for the promotion of S&T policies, the STA carries out yearly surveys on the activities of private corporations. In 1990 the agency conducted surveys on how private corporations are adapting to consumer trends, improvements in social and urban amenities, contributions to society, and the state of affairs in technology trade; these surveys centered on the new needs in private corporations' R&D activities and the state of affairs in technology trade.

Although a general summary of this FY1990 report was already partially published in the "FY1990 White Paper on Science and Technology," the detailed results of the survey are presented here.

We would like all concerned individuals to use this as a reference.

March 1991

Tadayoshi Suda, chief of the STA's Science and Technology Policy Bureau

I. Outline of Survey

1. Objective of Survey

In recent years the power of Japan's international influence has grown in proportion to the remarkable rise in its economic strength. On the other hand, as shown by the increasing tendency for trade disputes and other such problems, the fierceness of the international environment surrounding Japan intensifies.

One of the important issues that emerges in such a situation is that, through continual strengthening of its basic research, Japan strives to improve its level of S&T and aims to create the kind of S&T results that can be international contributions.

Amidst this the R&D activities of private corporations, which account for 70% of the money Japan uses for research, are becoming increasingly important. In recent years, more private corporations than ever before have begun to emphasize R&D; they are seen as playing an even greater role in raising the level of Japan's S&T and in the creation of international research results. In this sense the structure of corporate R&D and its changes are the focus of much attention.

While continuing to keep these facts in mind, this survey grasps the new demands made on the R&D activities of private corporations and the state of affairs in technology trade, and is meant to be of use in drawing up and promoting future S&T policies.

2. Subjects and Methods of the Survey

The subjects of this survey are private corporations with more than one billion yen in capital who carry out R&D activities (1,222 companies).

3. Timing of Survey

The survey was conducted from 12 July 1990 (questionnaires sent out) until 25 July (deadline).

The figures for capital and the numbers of employees or researchers are as of 31 March 1990; sales and R&D outlays are for FY1989; and any other figures are from the point in time when the questionnaire was filled in.

4. Response to the Survey

Of the 1,222 companies that were sent survey questionnaires, 857 responded (70.1% response rate) and 837 made valid responses (68.5% valid response rate). The following tables show

breakdowns by type of industry and by scale of capitalization of the firms that gave valid responses in the survey.

**Breakdown of Corporations Giving Valid Responses
By Type of Industry**

Type of Industry	Corporations Giving Valid Responses (837 Companies)
(1) Agriculture, forestry, fisheries	7
(2) Mining	4
(3) Construction	87
(4) Food products	55
(5) Textiles	21
(6) Pulp and paper	15
(7) Publishing and printing	6
(8) General chemicals	63
(9) Oils and paints	13
(10) Pharmaceuticals	37
(11) Other chemicals	41
(12) Petroleum products and coal products	20
(13) Plastic products	15
(14) Rubber products	8
(15) Ceramics	27
(16) Steel and iron manufacturing	43
(17) Nonferrous metals	31
(18) Metal products	32

(19) Machinery	64
(20) Electrical machinery and appliances	78
(21) Communications, electronic and electric measuring instruments	37
(22) Automobiles	45
(23) Other machinery for transport use	21
(24) Precision machinery	19
(25) Other manufacturing industries	12
(26) Transportation, communications, and public utilities	25
(27) Other kinds of industries	11

**Breakdown of Corporations Giving Valid Responses
By Scale of Capitalization**

Type of Industry	Corporations Giving Valid Responses (837 Companies)
(1) 1 to 5 billion yen	344
(2) 5 to 10 billion yen	177
(3) 10 to 50 billion yen	237
(4) 50 to 100 billion yen	45
(5) greater than 100 billion yen	34

(Note: General chemical industries means the chemical fertilizer, inorganic chemical, organic chemical, and synthetic fiber industries.)

II. Sales, R&D Expenditures, Numbers of Researchers, Etc. of Corporations That Responded

The following is a summary of the sales, R&D expenditures, numbers of researchers, etc., of the corporations that responded to the survey.

1. Sales

The total sales during FY1989 of the corporations that responded to the survey was 190.0456 trillion yen. By type of industry, the automobile industry had the highest sales (23.6253 trillion yen). That is followed by the construction industry (23.0247 trillion yen); transportation, communications, and public utilities (23.0075 trillion yen); and the electrical machinery and appliances industry (22.095 trillion yen).

2. R&D Expenditures

The total amount of R&D expenditures during FY1989 was 5.6456 trillion yen, which is 6.87650 billion yen per company.

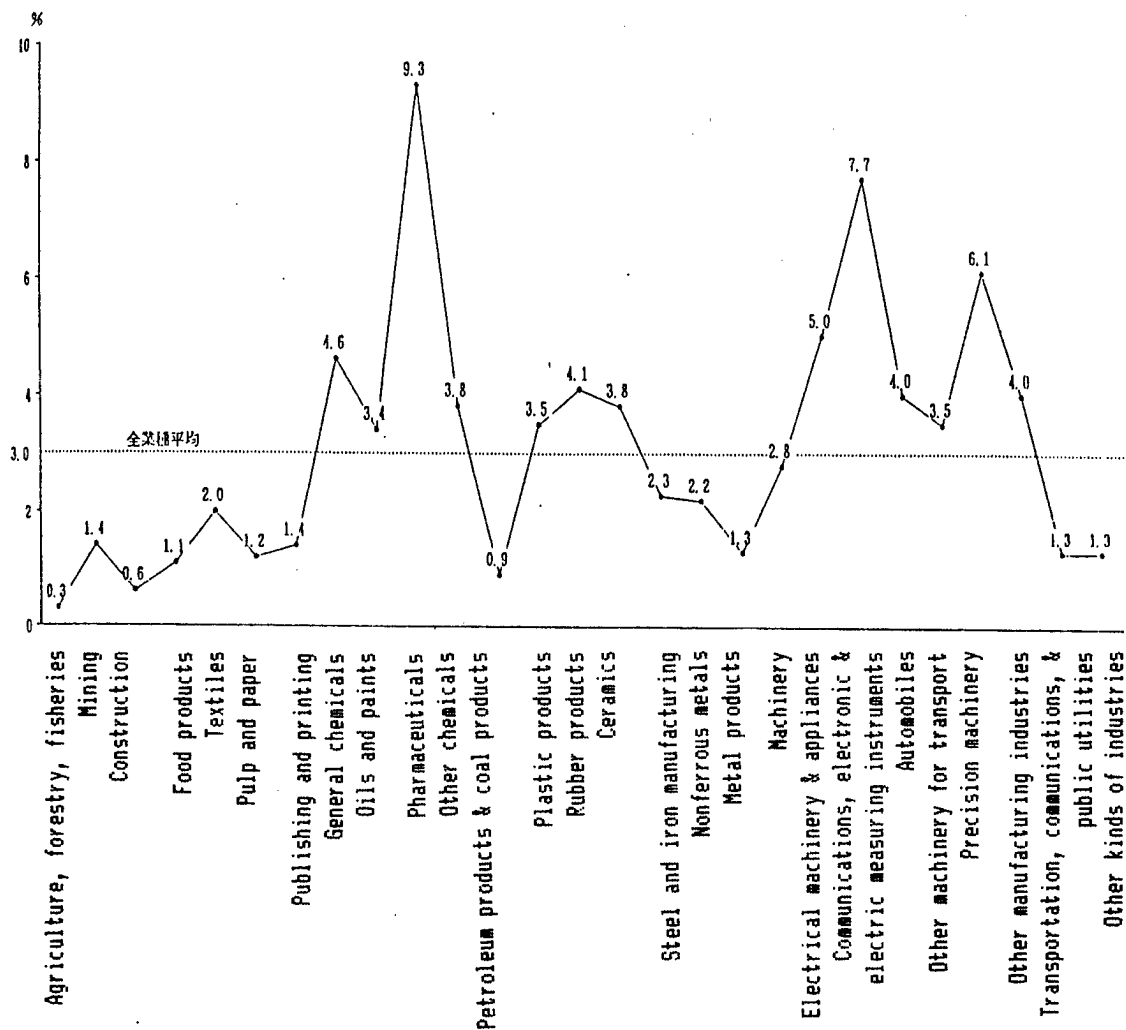
Looking at per-company R&D expenditures according to the type of industry, the order of those that disburse the most money for R&D is the automobile industry (21.34130 billion yen); the communications, electronic and electric measuring instruments industry (20.52970 billion yen); and the electrical machinery and appliances industry (14.58640 billion yen).

Also, if we look at the ratio of R&D expenditures to sales by type of industry, the ratio is high in the so-called high-tech related industries: pharmaceuticals; communications, electronic and electric measuring instruments; precision machinery; and electrical machinery and appliances. The average ratio of R&D expenditures to sales for all types of industries is 3.0% (Figure 1).

3. Numbers of Researchers

As of 31 March 1990 there was a total of 189,505 people in the corporations surveyed whose regular jobs are to do research. By type of industry, the order is electrical machinery and appliances (37,695 people); communications, electronic and electric measuring instruments (32,301 people); automobiles (29,036 people), and so forth. If we look at the per-company number of researchers according to the type of industry, the communications, electronic and electric measuring instruments industry had the most, 873 people; followed by the automobile industry, with 645 people, and the electrical machinery and appliance industry, with 483 people.

Figure 1. Ratios of R&D Expenditures to Sales



Looking at the percentage of all employees that are researchers, the communications, electronic and electric measuring instruments industry has the largest, 13.7%. Next come the oil and paint industry, 12.6%, and the general chemicals industry, 12.3%. The average over all types of industries is 5.9%.

Incidentally, there were 302 foreign researchers employed by the corporations that were surveyed. By industry, the machinery industry employed the most, 82 people; then come the electrical machinery and appliance industry, with 36 people, and the communications, electronic and electric measuring instruments industry, with 25 people.

4. Numbers of Patents Held

As of 31 March 1990 the corporations surveyed held 548,486 patents, which comes to 675 per corporation. By the type of industry, the electrical machinery and appliance industry had the most, 136,798 patents; followed by the communications, electronic and electric measuring instruments industry (62,469 patents) and the general chemical industry (58,068 patents).

5. Other

Although the subjects were different than those of this survey, we can use the FY1990 corporate R&D expenditures from the "FY1990 Report of S&T Research Survey" by the Management and Coordination Agency's Statistics Bureau as a reference. The following reference table compares this survey with that report.

Reference Table: Comparison With Report of S&T Research Survey

Category	This Survey	Report of S&T Research Survey
R&D expenditures	5.6456 trillion yen	8.2171 trillion yen
Ratio of R&D expenditures to sales	2.97%	2.72%
Subject of investigation	Private firms with at least 1 billion yen in capital who carry out R&D	Companies with at least 5 million yen in capital
	1,222 companies	About 12,500 companies
Data collected, etc.	Aggregate totals computed on 837 (68.5%) of the 1,222 companies that made valid responses to the survey.	After collecting 80% of the approximately 12,500 objects of the survey, about 840 secondary samples were selected from the approximately 2,500 objects not collected, then all of the questionnaires related to these secondary samples were collected. Estimates were made with the questionnaires collected by multiplying each level with the inverse of the sampling rate. At this time the questionnaires of the objects selected as secondary samples were again multiplied by the inverse of the sampling rate.

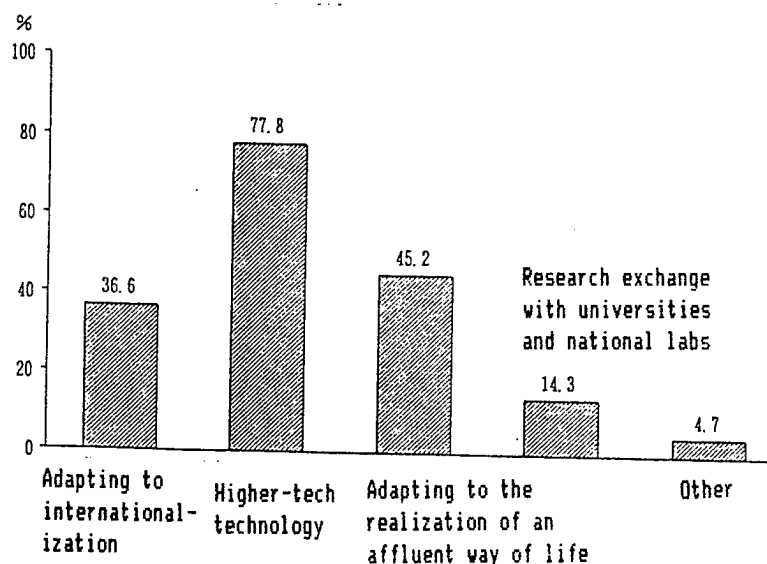
III. Summary of Survey Results

1. Adapting to Consumer Trends

(1) R&D Directions During the 1990s

The number of corporations that stress R&D has been growing, but with respect to the directions that R&D has taken during the 1990s, 78% of the corporations surveyed replied "higher-tech technology"; 45%, "adapting to the realization of an affluent way of life"; and 37%, "adapting to internationalization" (Figure 2).

Figure 2. R&D Directions During the 1990s

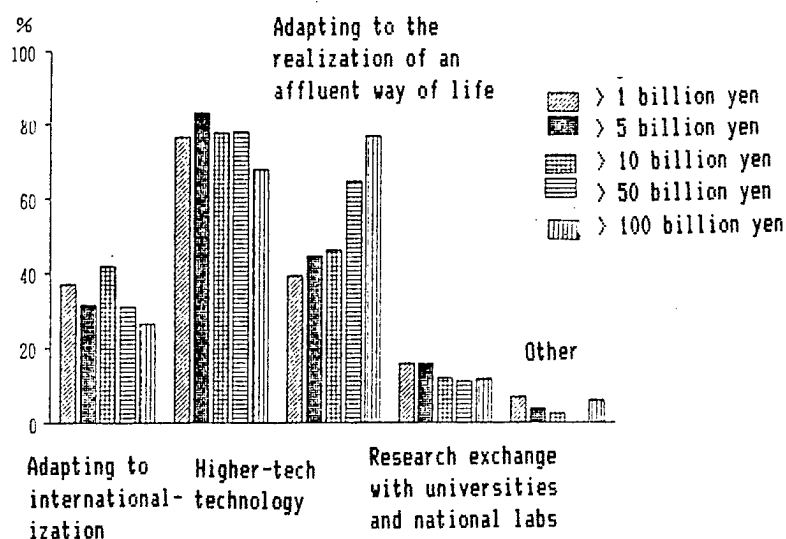


(Note: Based on multiple answers.)

Looking at R&D directions by the type of industry, more than 70% of the different types of industries replied "higher-tech technology." The types of industries where much of the R&D is for "adapting to the realization of an affluent way of life" were the agriculture, forestry, and fisheries industry, 86%; the food products industry, 81%; the textile industry, 81%; and transportation, communications, and public utilities, 76%. In the types of industries that are deeply related to the lifestyles of the nation's people, the trend seen in the 1990s is R&D for the purpose of realizing an affluent way of life. As for "adapting to internationalization," the most responses came from the pharmaceuticals industry, 76%; the mining industry, 75%; and the rubber products industry, 75%.

Looking at R&D directions according to the scale of capitalization, there was not much connection between scale of capitalization and R&D for the purposes of "higher-tech technology" and "adapting to internationalization." In contrast, the response rate for "adapting to the realization of an affluent way of life" gets higher as the scale of capitalization gets larger: although 39% were corporations with "more than 1 billion yen and less than 5 billion yen," 76% of the corporations with "more than 100 billion yen" gave this reason for their R&D, which was much more than those high-capitalization corporations that replied "higher-tech technology" (Figure 3).

**Figure 3. R&D Directions During the 1990s
(By Scale of Capitalization)**



(Note: Based on multiple answers.)

(2) Level of Technology Related to the People's Way of Life

In response to the question of whether the corporation's level of technology was adequate for the realization of an affluent way of life in Japan, 26% replied "adequate," whereas 58% replied "more or less adequate," and 11% replied "considerably inadequate." The result is that we cannot say that the technology related to the people's way of life is adequate (Figure 4).

As the reasons for an inadequate level of technology, 43% said that it was "due to lack of specialized researchers," 23% said "because there were no problems in the existing route," 16% said "because there was not much need," and 14% said "due to

difficulties in developing technology." The greatest reason is the shortage of researchers (Figure 5).

Figure 4. Level of Technology Related to People's Lifestyles

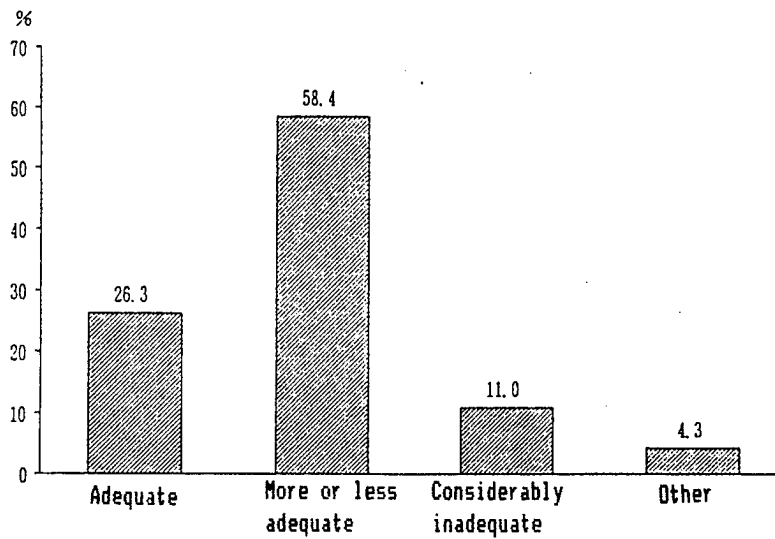
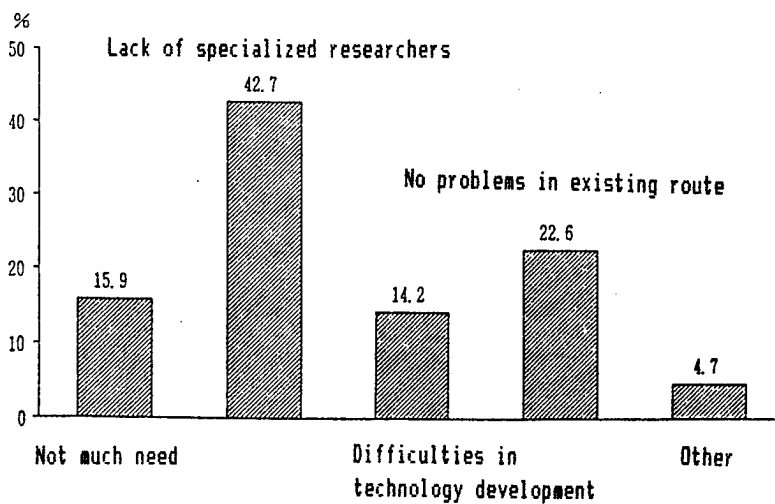


Figure 5. Reasons Why Technology Levels Are Inadequate



(3) Obstacles in Technology Utilization

In response to the question of whether or not there are times when the regulatory or economic social system hinder the utilization of technology, 9% said "often," 57% said "sometimes," 24% said "seldom," and 8% said "hardly ever." We can gather that there are some obstacles (Figure 6).

Figure 6. Obstacles in Technology Utilization

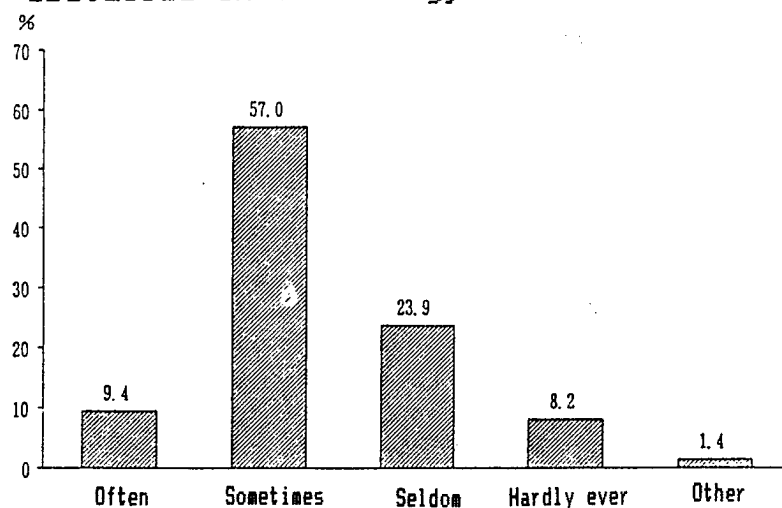
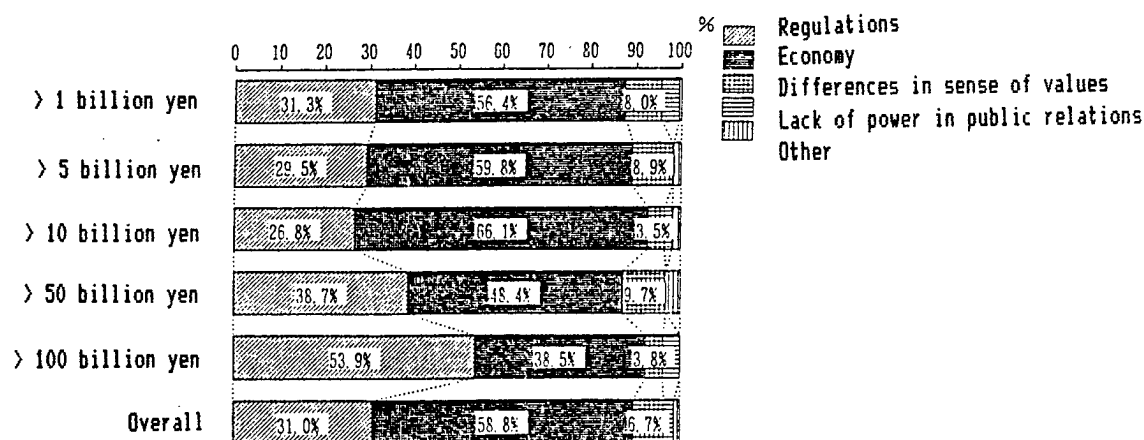


Figure 7. Causes of Obstacles



As the causes of obstacles in technology utilization, 59% said "economy," 31% said "regulations," 7% said "differences in sense of values," and 2% said "lack of power in public relations." The result is that the major cause of obstacles in the utilization of technology is the existence of regulations and problems having to do with economy.

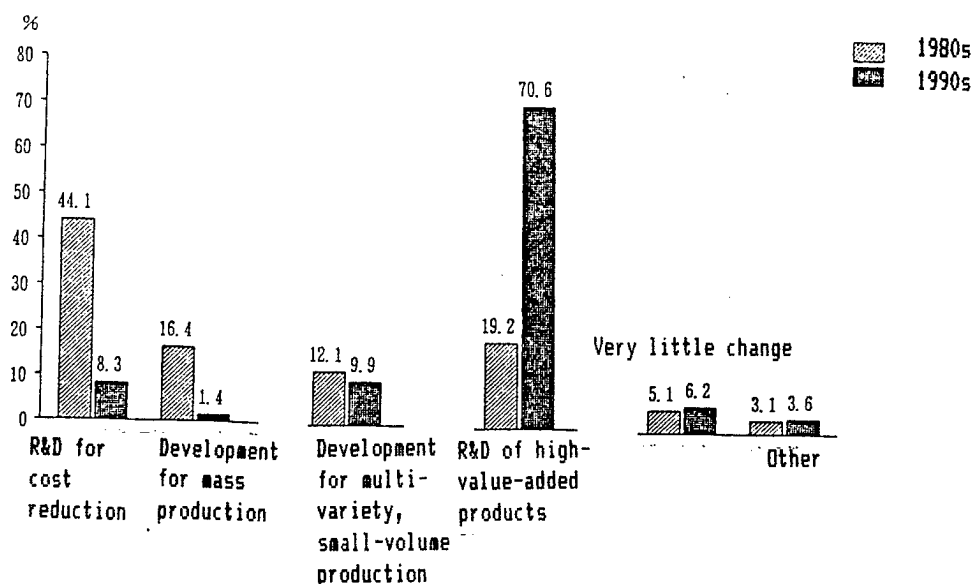
The types of industries where "economy" got the largest response were the plastic products industry, where 100% of the corporations replied "economy"; and the steel industry, 83%. The types of industries where "regulations" got the largest response were the pharmaceuticals industry, 58%, and the construction industry, 41%.

Looking at the responses according to the scale of capitalization, a trend is seen where the larger the scale, the more corporations responded "regulations" and the fewer responded "economy" (Figure 7).

(4) Changes in Consumer Needs

In response to the questions of where the emphasis was placed during the 1980s and then during the 1990s from the viewpoint of accommodating consumer needs, which are said to be continually changing, 44% of the corporations surveyed said that during the 1980s they stressed "R&D for the purpose of reducing costs"; 19%, "R&D of high-value-added products"; 16%, "development for the purpose of mass production"; and 12%, "development for the purpose of multi-variety, small-volume production." During the 1990s, 71% of the corporations stressed "R&D of high-value-added products"; 10%, "development for the purpose of multi-variety, small-volume production"; 8%, "R&D for the purpose of reducing costs"; and 1%, "development for the purpose of mass production." During the 1990s there was a tremendous increase in R&D for high-value-added products, and there were fewer

Figure 8. Changes in Consumer Needs



corporations with the goals of cost-reduction and mass-production, which were numerous during the 1980s (Figure 8). The results supports the fact that industry has become more advanced.

During the 1980s a relatively large number of corporations in all types of industries emphasized cost reduction goals; in particular, 75% of the corporations in the mining industry and 65% of the those producing machinery for use in transport stressed cost reduction. The types of industries where many corporations stressed "R&D of high-value-added products" during the 1980s were the publishing and printing industry, 67%, and the pharmaceuticals industry, 57%. Then, during the 1990s, more than 50% of the corporations in all industries emphasized "R&D of high-value-added products."

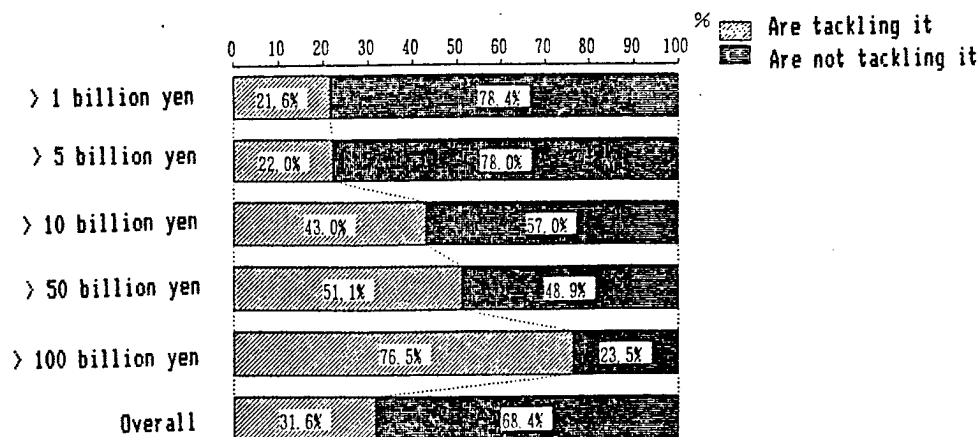
(5) R&D for Aiding the Elderly and Disabled

When asked whether or not they are tackling the R&D of products that help to promote the participation in society of elderly and disabled people, in a time when Japan is rapidly moving towards an aged society, 32% of the corporations surveyed said that they "are tackling it" and 68% said that they "are not tackling it."

By type of industry, 78% of the pharmaceuticals companies, 71% of the agricultural, forestry, and fisheries companies, and 55% of the food products companies said that they are tackling the R&D of such products.

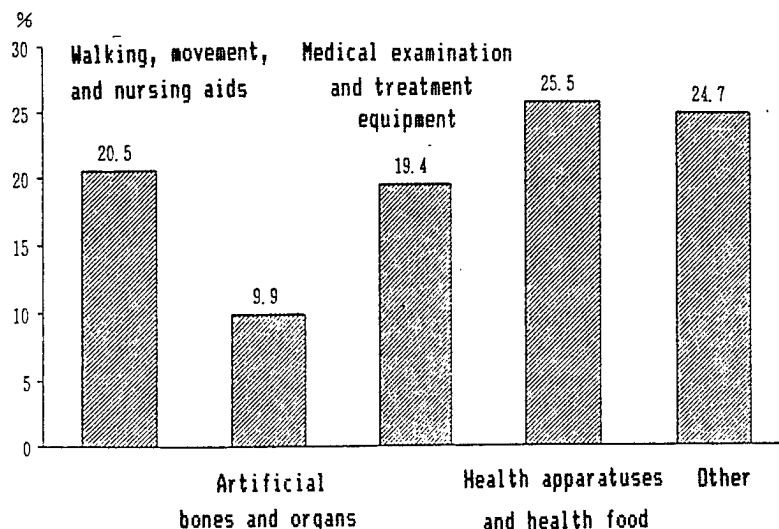
According to the scale of capitalization, the larger the scale the higher the percentage of corporations that are tackling such R&D; 76% of the corporations with more than 100 billion yen in capital replied that they "are tackling it" (Figure 9).

Figure 9. R&D for Aiding the Elderly and Disabled



Furthermore, when we asked the corporations that are tackling such R&D what kind of R&D they are doing, 25% replied "health apparatuses and health food"; 21%, "walking, movement, and nursing aids"; 19%, "medical examination and treatment equipment"; and 10%, "artificial bones and organs" (Figure 10).

Figure 10. R&D To Assist Elderly and Disabled People



(6) R&D For Health Maintenance and Promotion

When asked whether they are carrying out R&D that relates to health maintenance and promotion, 31% of the corporations surveyed replied "yes" and 69% replied "no."

95% of the corporations in the food products industry, 86% of the those in the agricultural, forestry, and fisheries industry, and 81% of those in the pharmaceuticals industry replied that they are carrying out such R&D.

According to the scale of capitalization, the larger the scale, the higher the percentage of corporations carrying out such R&D. Half of the corporations with more than 100 billion yen in capital are carrying out R&D for health maintenance and promotion (Figure 11).

Furthermore, 50% said that the content of that R&D was "health foods and health drinks," 14% said "health maintenance and promotion apparatuses," and 14% said "health diagnostic equipment" (Figure 12).

Figure 11. R&D For Health Maintenance and Promotion

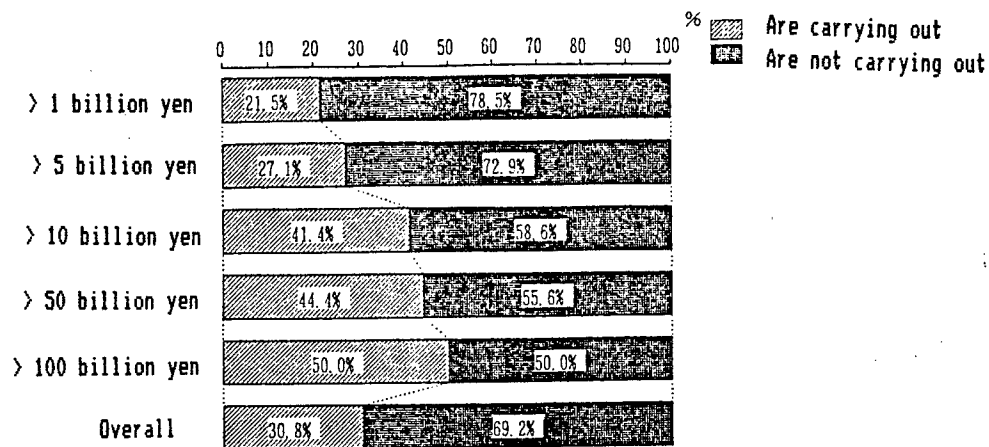
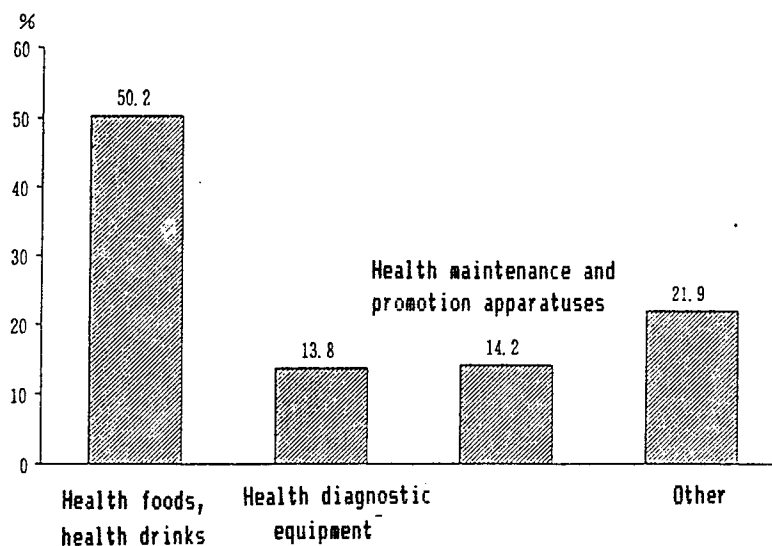


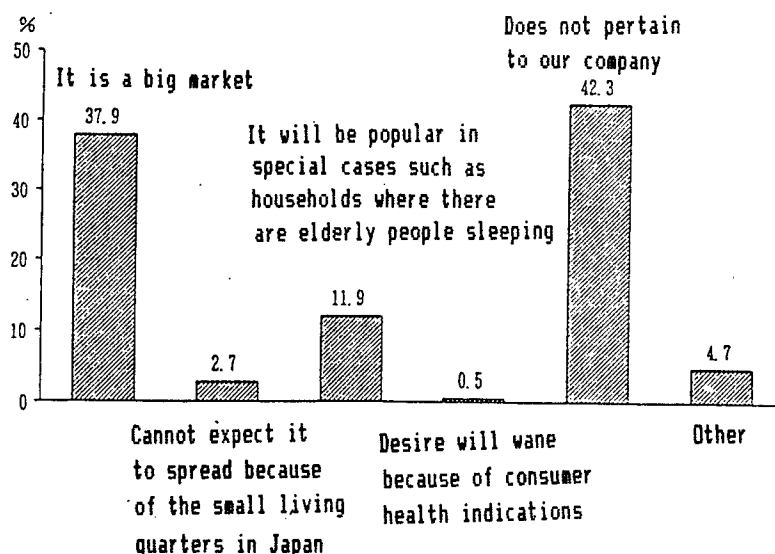
Figure 12. Areas of Health Maintenance and Promotion R&D



(7) Predicting the Spread of Home Automation

We asked the corporations whether or not they foresee home automation permeating any further into people's lifestyles. 38% of the corporations surveyed think that "it is a big market"; 12% think that "it will spread as long as there are special needs such as households where there are bedridden elderly people;" and 42% said that "it does not pertain to our company" (Figure 13).

Figure 13. Predicting the Spread of Home Automation



By type of industry, 60% of the plastic products industry, 59% of the communications, electronic and electric measuring instruments industry, and 58% of the electrical machinery and appliance industry think that "it is a big market."

By scale of capitalization, the larger the scale, the larger the percentage of companies that think "it is a big market": 28% of those with "more than 1 billion yen and less than 5 billion yen" think so, whereas 61% of those with "more than 100 billion yen" think so.

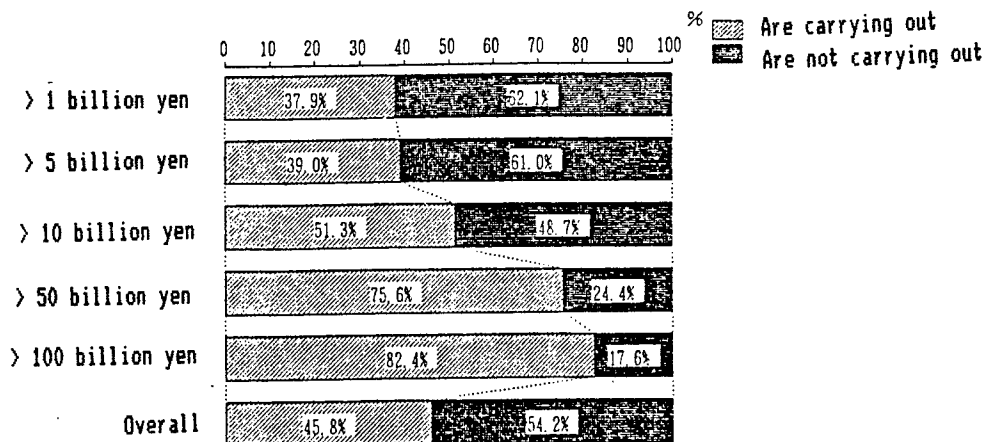
2. Improving Social and Urban Amenities

(1) Urban Construction and Technology

When asked if they are tackling R&D for the purpose of increasing the safety and comfort of cities, 46% of the corporations surveyed said that they are, and 54% said that they are not.

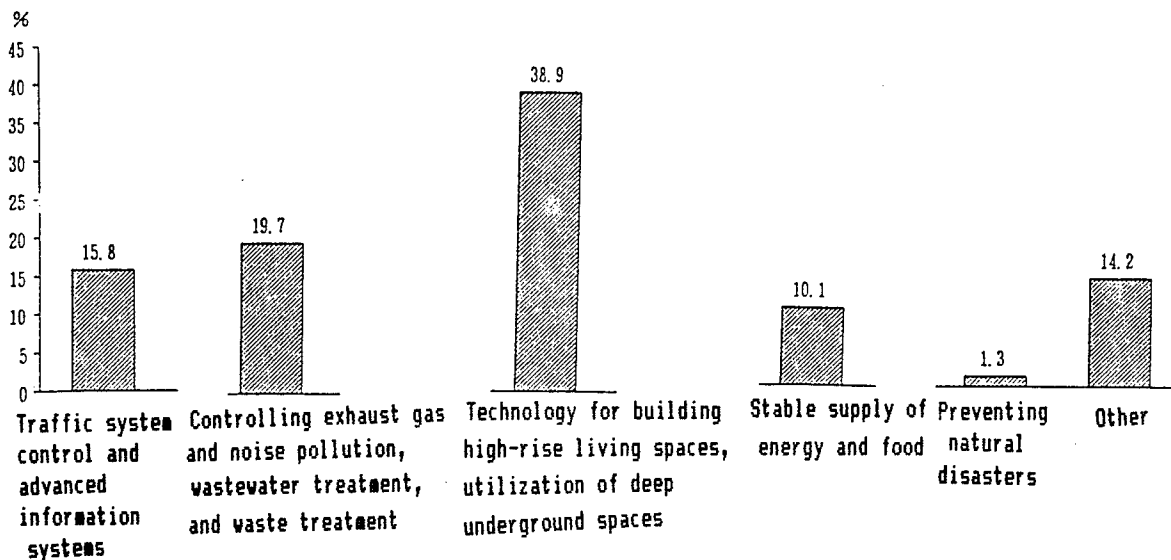
By type of industry, the highest percentages of corporations that are tackling such R&D are the mining industry, where 100% of the corporations surveyed are undertaking this kind of R&D; the construction industry, 85%; and transportation, communications, and public utilities, 84%. By scale of capitalization, the larger the scale, the higher the percentage of corporations that are tackling such R&D; 38% of those with "more than 1 billion yen and less than 5 billion yen" are doing so, whereas 82% of those with "more than 100 billion yen" are doing so (Figure 14).

Figure 14. R&D For Urban Cultivation



When the corporations that are tackling such R&D were asked what kind of areas they are dealing with, 39% said "controlling exhaust gas and noise pollution, wastewater treatment, and waste treatment"; 20% said "technology for building high-rise living spaces and the utilization of deep underground spaces"; 16% said "traffic system control and advanced information systems"; and 10% said "stable supply of energy and food" (Figure 15).

Figure 15. Areas of R&D for Urban Cultivation

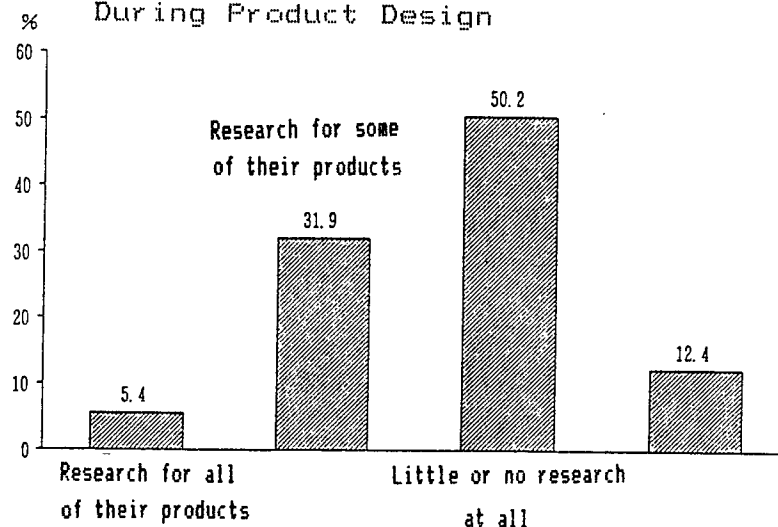


(2) Consideration Given to Environmental Preservation During Product Design

With garbage and waste processing becoming a problem, when we asked the corporations if they are conducting research related to methods of processing and re-using products after they are

consumed, 5% replied that they are doing "research for all of their products"; 32%, "research for some of their products"; and 50%, "very little or no research at all" (Figure 16). When the corporations that responded with the latter two answers were asked what they think about the disposal and re-use of their products, 23% said "processing or re-utilization methods have already been established"; 22% said "research on disposal and recycling should be done in our company"; 17% said "our hands are full with research related to products or competitive strength"; and 9% said "the government should development the technology and take care of disposal (re-use)." This shows the diversified ways of dealing with the issue (Figure 17).

Figure 16. Consideration Given to Environmental Preservation During Product Design



3. Corporations' Social Contributions

(1) Exhibition Halls, Etc.

About 7% of the corporations surveyed have exhibition halls, museums, or other such places related to S&T that are open to the general public (excluding showrooms). The transportation, communications, and public utilities industry was where the largest percentage, 40%, of corporations have exhibition halls and so forth; for other industries it was less than 20%. When we asked the corporations that do not have exhibition halls and so forth if they plan to set up such places in the future, there were 9 companies (1%) with concrete plans to do so, and 43 companies (6%) that are looking into setting up such places.

As for the contents of the exhibition halls, 49% are "about the company's technology"; 30% are "about the industry's technology"; and 16% are "about S&T history and new technology" (Figure 18).

Figure 17. Disposal and Re-Use of Products

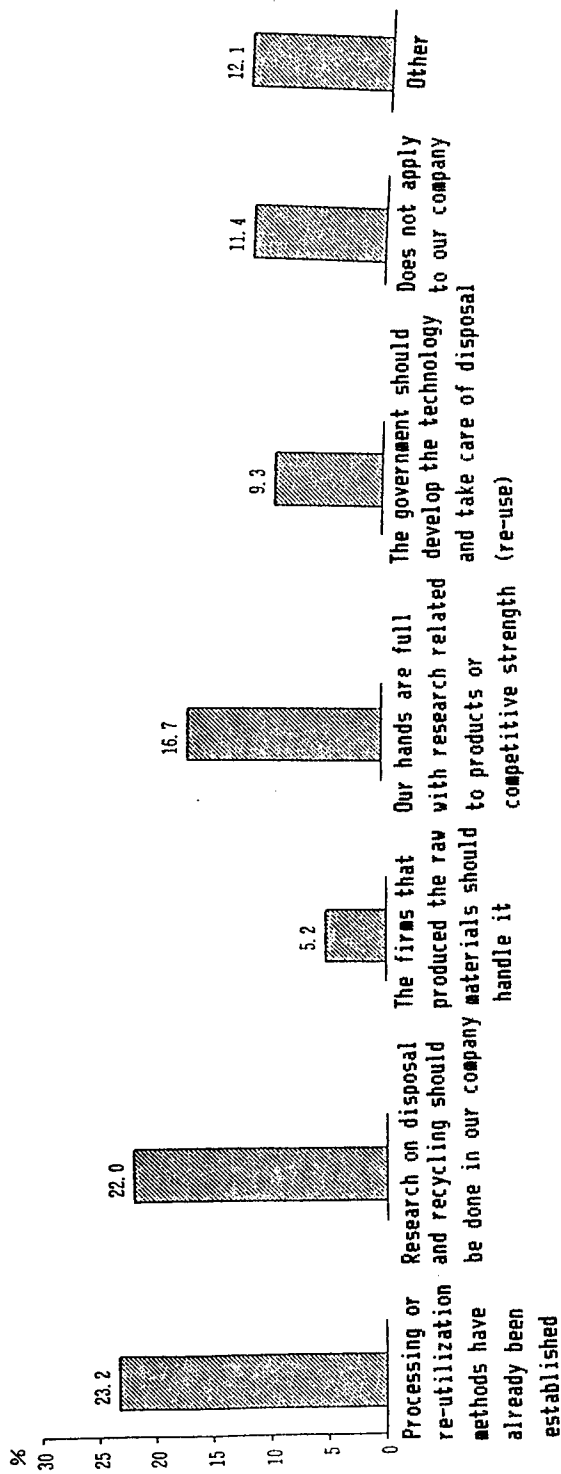


Figure 18. Contents of Exhibition Halls

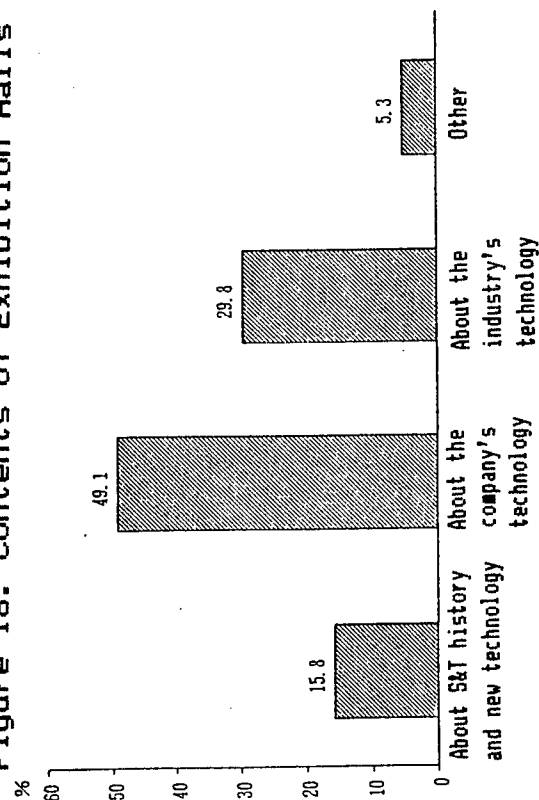
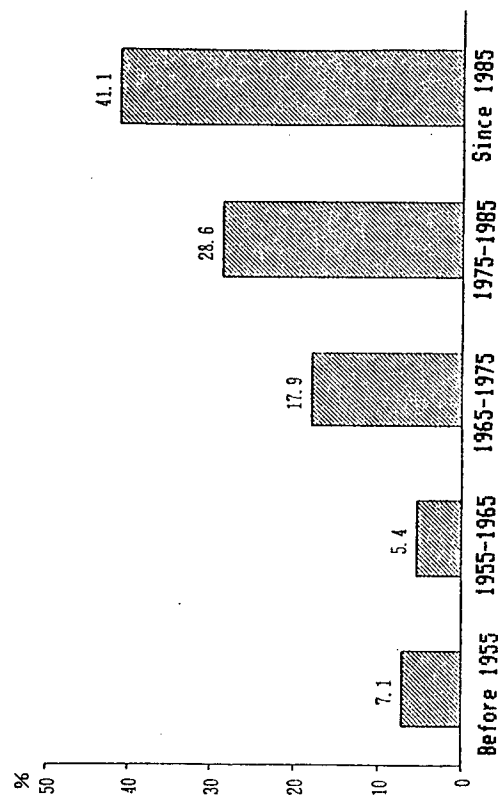


Figure 19. Years When First Opened



As for the years when the exhibition halls first opened, 41% opened "after 1985," and 29% "from 1975 to 1985." 70% of the exhibition halls have been set up during the last 15 years: interest is gradually increasing (Figure 19).

(2) Support of Academic Societies, Etc.

Private corporations' contributions to society is becoming an issue. When asked what they think about donating to universities, and supporting academic societies, symposia, and so forth, 30% of the corporations surveyed said that it is "a part of the company's social activities"; 30% said that it is "a way of activating research through raising the consciousness of researchers"; 20% said that it is "a way of gathering information"; and 8% said that they "do not carry out such support" (Figure 20). Most of the corporations support academic societies and so forth; their high level of interest is apparent.

(3) Technical Fields of Personnel Employed

When asked what kinds of technical fields they intend to hire personnel in for the purpose of strengthening their R&D power, 38% of the corporations surveyed said "information, electronics, and software"; 37% said "substances, materials, and processing"; 10% said "life sciences"; and 7% said "cities and construction." There were virtually no corporations that replied "humanities and social sciences" (Figure 21).

The types of industries where a large percentage of the corporations surveyed replied "information, electronics, and software" were pulp and paper; precision machinery; communications, electronic and electric measuring instruments; electrical machinery and appliances; and machinery. Those where many replied "substances, materials, and processing" were rubber products, petroleum products and coal products, and oils and paints. Those where many replied "life sciences" were pharmaceuticals and food products.

On the other hand, when asked about their sources of personnel other than new graduates, 73% said "male researchers," 3% said "female researchers," and 3% said "foreign researchers." As for the employment of female researchers, there were no differences due to scale of capitalization. But, the corporations with larger amounts of capital employ more foreign researchers (Figure 22).

Figure 20. Support of Academic Societies, Etc.

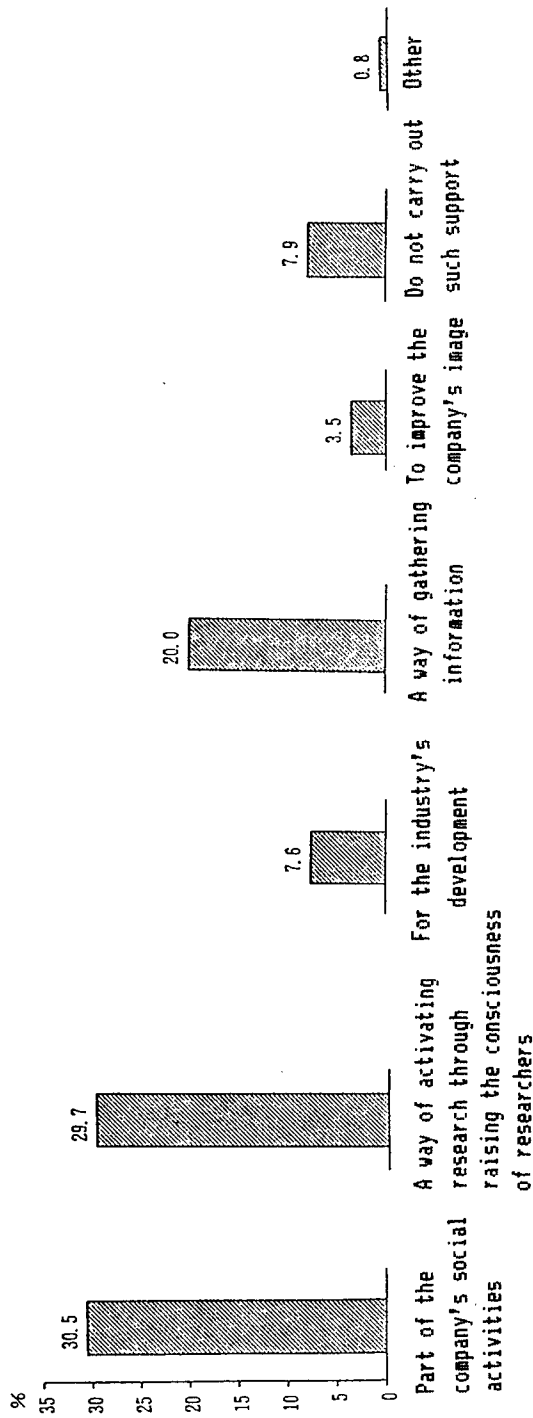


Figure 21. Technical Fields of Personnel That Corporations Will Hire

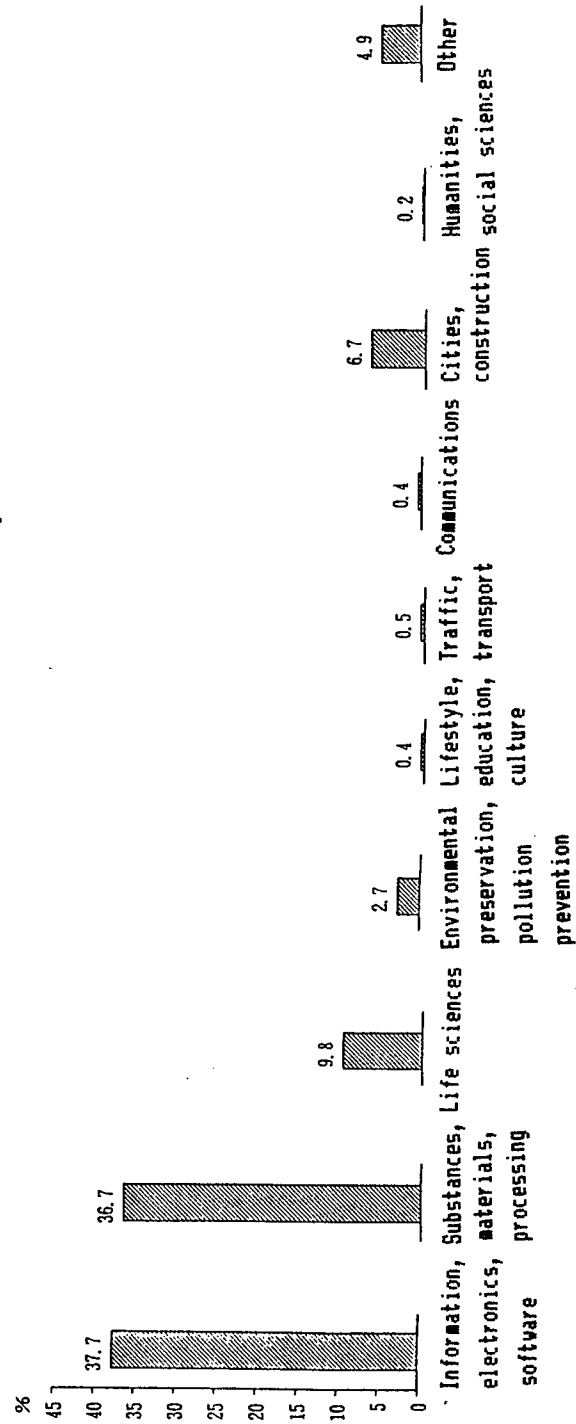
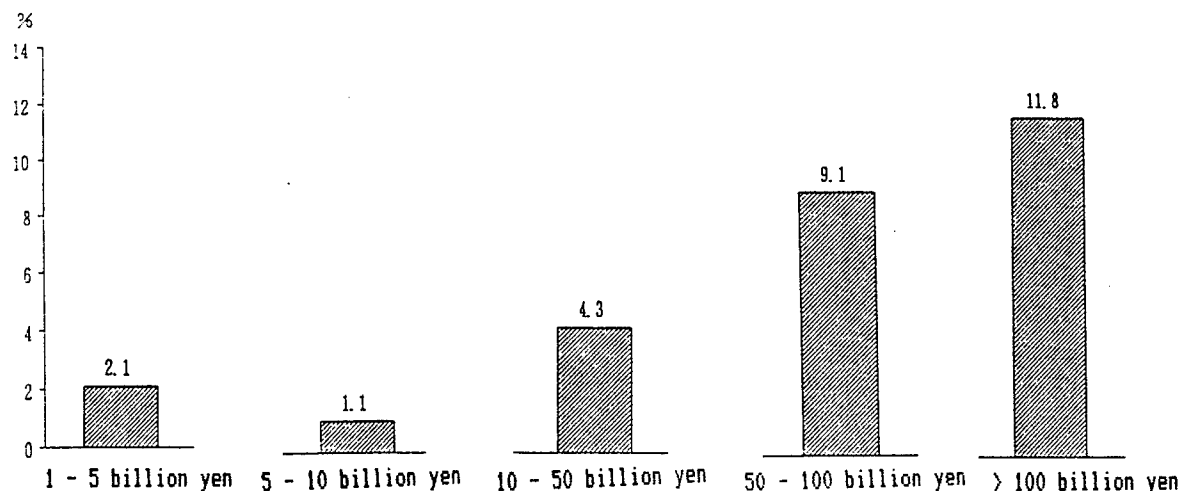


Figure 22. Employment of Foreign Researchers



(4) Development and Assessment of New Products

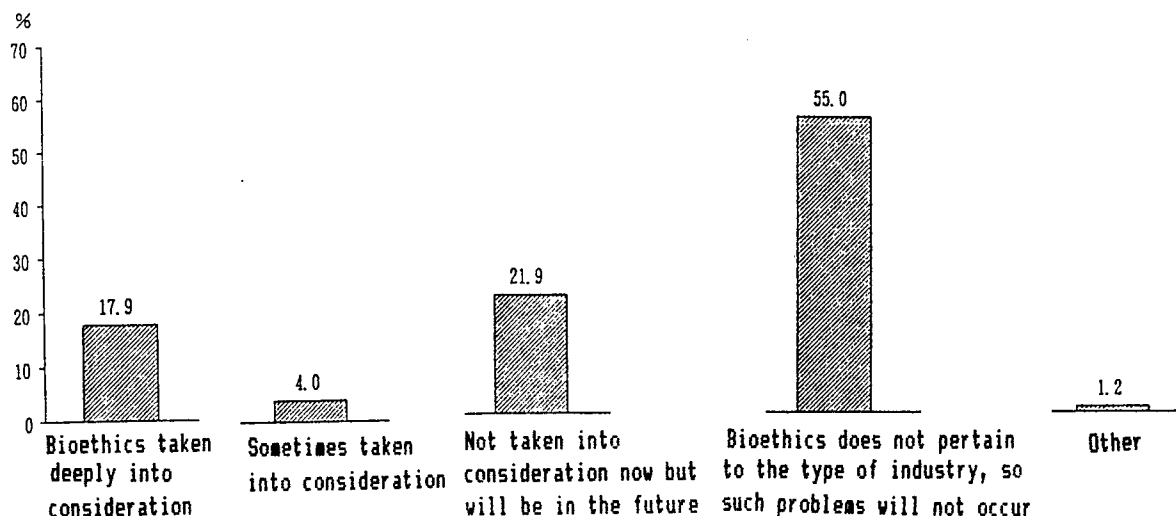
When asked whether they have special posts (organizations) that research the social impact of a new product when it is being developed, 11% of the corporations surveyed said that they "have," and 89% said that they "do not have" such posts.

The types of industries where there were large percentages of corporations that have such posts were pharmaceuticals; food products; and agriculture, forestry, and fisheries. By scale of capitalization, 24% of the corporations with "more than 50 billion yen and less than 100 billion yen," and 18% of those with "more than 100 billion yen" said that they do have such posts. The corporations with larger amounts of capital are more likely to have such posts.

(5) Bioethical Considerations

When we asked life-sciences-related corporations whether they have ever taken bioethics into consideration during their R&D, although 55% replied "those kinds of problems will not occur because bioethics does not pertain to our type of industry," 22% said "we take it into consideration now and will do so in the future," and 18% said "we take bioethics deeply into consideration." It is apparent that in life-sciences-related corporations emphasis is being placed on bioethical considerations (Figure 23).

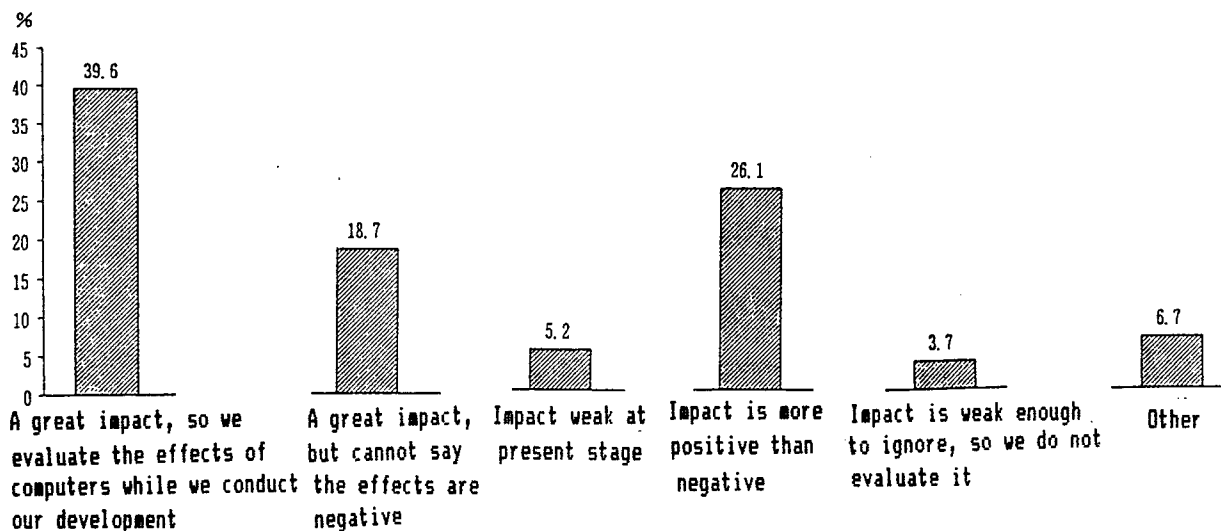
Figure 23. Bioethical Considerations



(6) The Impact of Computers

When we asked computer-related corporations if they evaluate the impact of computers on society when they conduct R&D, 40% said that "the impact is great, so we evaluate the effects of computers while we conduct our development"; 26% said that "the impact of computers is more positive than negative"; and 19% said that "although the impact is great, we cannot say that there are negative effects" (Figure 24).

Figure 24. The Impact of Computers



(7) International Comparison of Technology

When we asked the corporations involved with nine technologies, which include "well-being equipment to assist elderly people," "methods for designing comfortable living spaces," and "household electrical products," what the level of their technology is in comparison with other countries, 60% of the corporations involved with "household electrical products" said "we are ahead of the U.S. and Europe"; and 69% of those involved with "well-being equipment to assist elderly people" said "we are behind the U.S. and Europe." As for the other seven technologies, most of the corporations replied "same as the U.S. and Europe." Of those, there were comparatively large numbers of corporations involved with "technology for preventing environmental pollution" and "information and communications equipment" that said "we are ahead of the U.S. and Europe"; and there was a comparatively large number of corporations involved with "methods for designing comfortable living spaces" that replied "we are behind the U.S. and Europe" (Figure 25).

4. State of Technology Trade

(1) Amounts of Technology Trade

As for the technology trade between Japanese corporations and foreign countries, where patents, know-how, technical guidance, and so forth are supplied and received, exports totaled 107.5 billion yen (amount received), and imports totaled 101.3 billion yen (amount paid out).

Exports were the highest for the automobile industry, electrical machinery and appliance industry, and the steel and iron industry. The types of industries with the largest amount of imports were electrical machinery and appliances, and machinery for non-automotive transport use. Trade balances (exports/imports) were very favorable for the automobile industry and the steel and iron industry (Figure 26). According to scale of capitalization, large corporations are at the center of technology exports; those with more than 50 billion yen in capital account for 58% of the total amount of technology exports. Large corporations are not as central in technology imports: corporations with more than 10 billion yen and less than 50 billion yen account for 44% of the total amount of technology imports; those with more than 50 billion yen, 34%.

Also, the estimated total amount of offsets of technology trade exports and imports based on cross-licensing contracts was 5.4 billion yen, which was about 2.6% of the technology trade amount (the total amount of exports and imports). By type of industry, pharmaceuticals, and electrical machinery and appliances




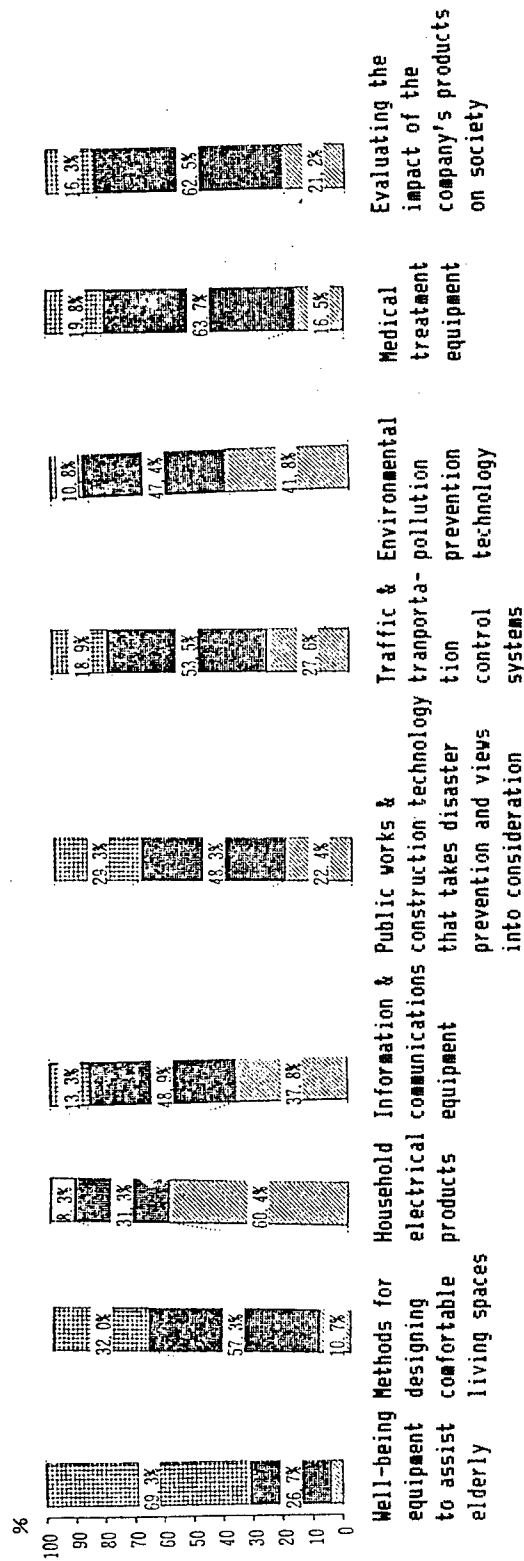
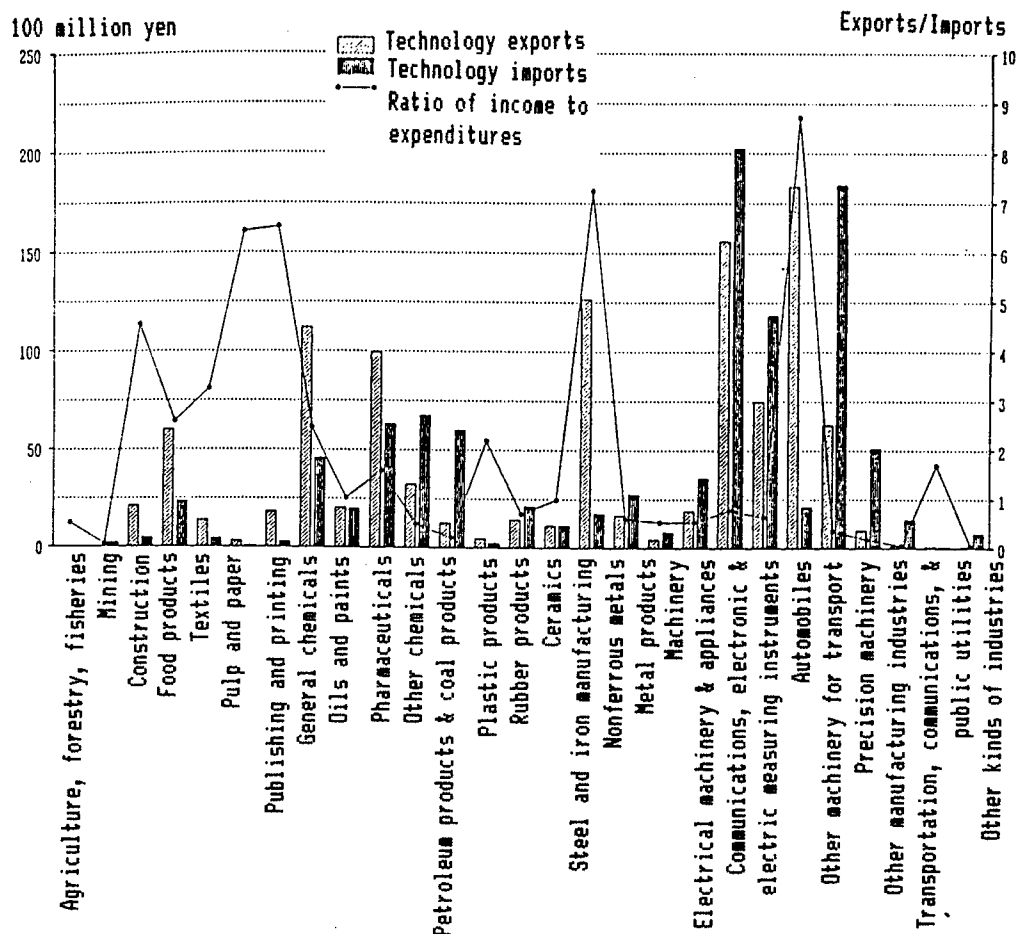
 Ahead of U.S. and Europe
 Same as U.S. and Europe
 Behind U.S. and Europe

Figure 25. International Comparison of Technology



accounted for 69% of the estimated total amount of offsets; by scale of capitalization, this was concentrated in corporations with more than 10 billion yen and less than 50 billion yen (78%) (Figure 27).

Figure 26. Technology Trade, and Technology Exports and Imports



(2) State of Technology Trade Balance

When asked about the state of technology trade balance with respect to their principal businesses and their new enterprises, in their principal lines of business, 46% showed a favorable trade balance; 40%, unfavorable; and 14%, balance. In their new enterprises, 55% had an unfavorable trade balance; 27%, balance; and 17%, a favorable trade balance. In comparison with the principal line of business, a trend is seen where corporations look overseas for technology when they launch new enterprises. Incidentally, in the overall technology trade balances for both original business and new enterprises combined, 50% of the corporations imported more than they exported; 41% exported more; and 9% showed a balance (Figure 28).

Figure 27. Amounts of Cross-Licensing

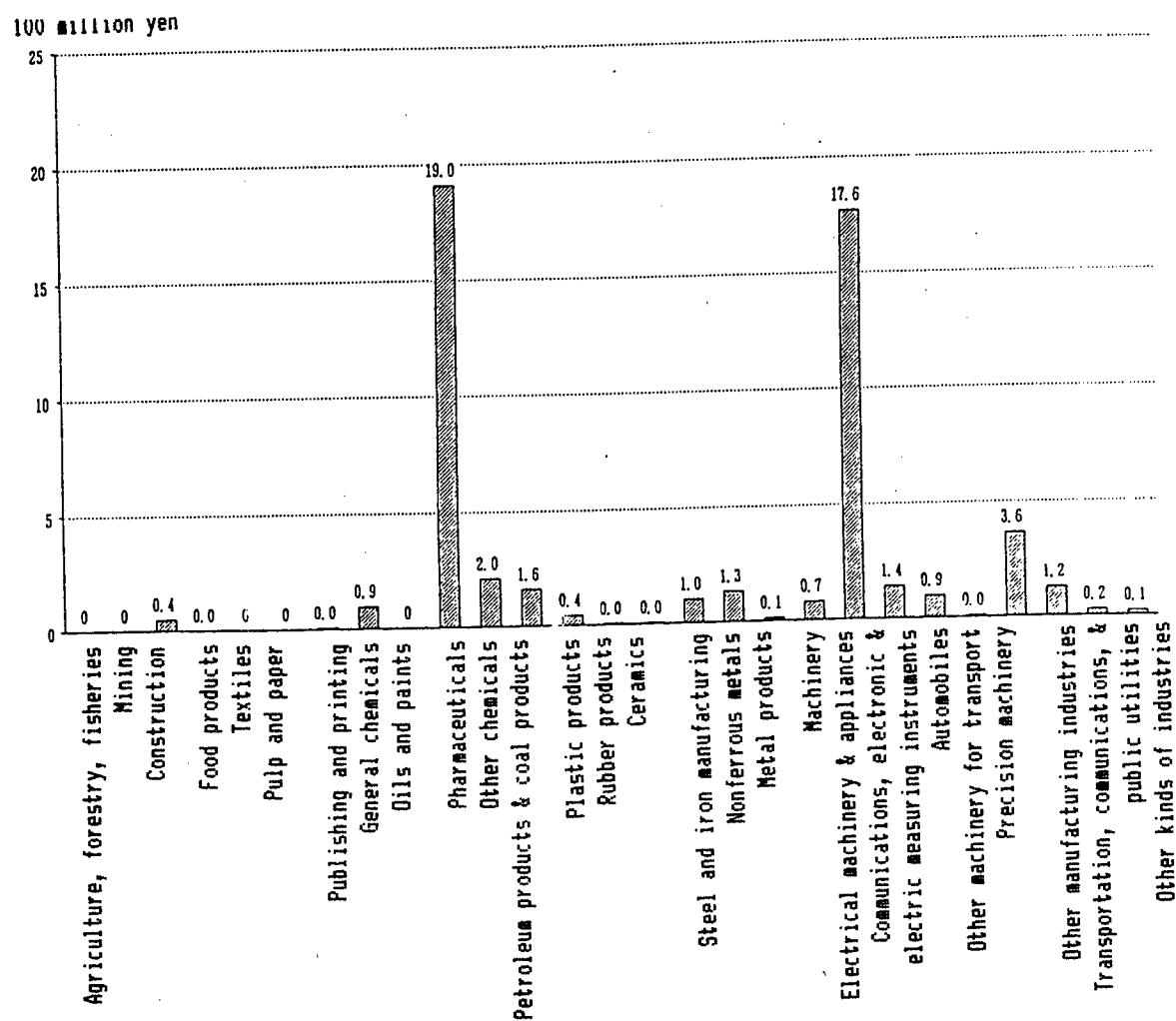
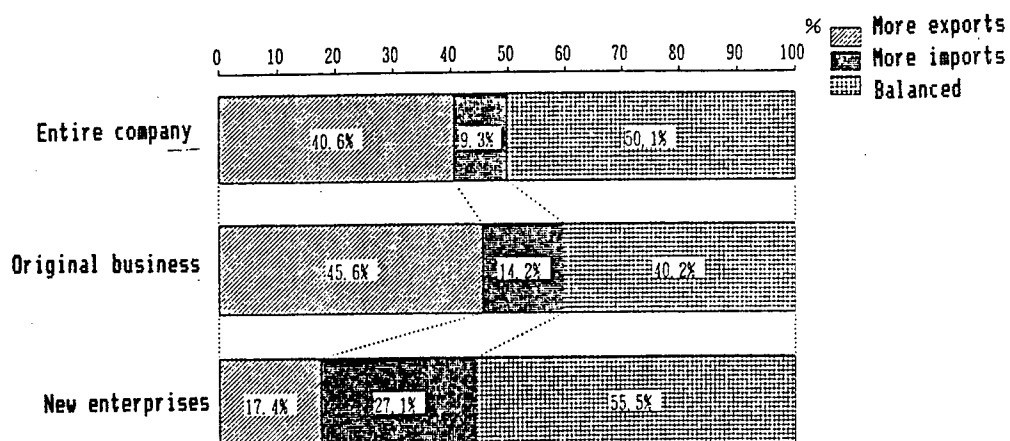


Figure 28. State of Technology Trade



Also, when we asked those corporations that had unfavorable technology trade balances for the entire company why they imported more than they exported, 53% said "because historically foreign countries have had the basic patents"; 25% said "because of business restructuring"; and 24% said "there is no room for basic research in our company." We shall take this to be the state of viscious competition over technology development within Japan, together with the important role that foreign patents play, even today, in the basic technology of the industrial world (Figure 29).

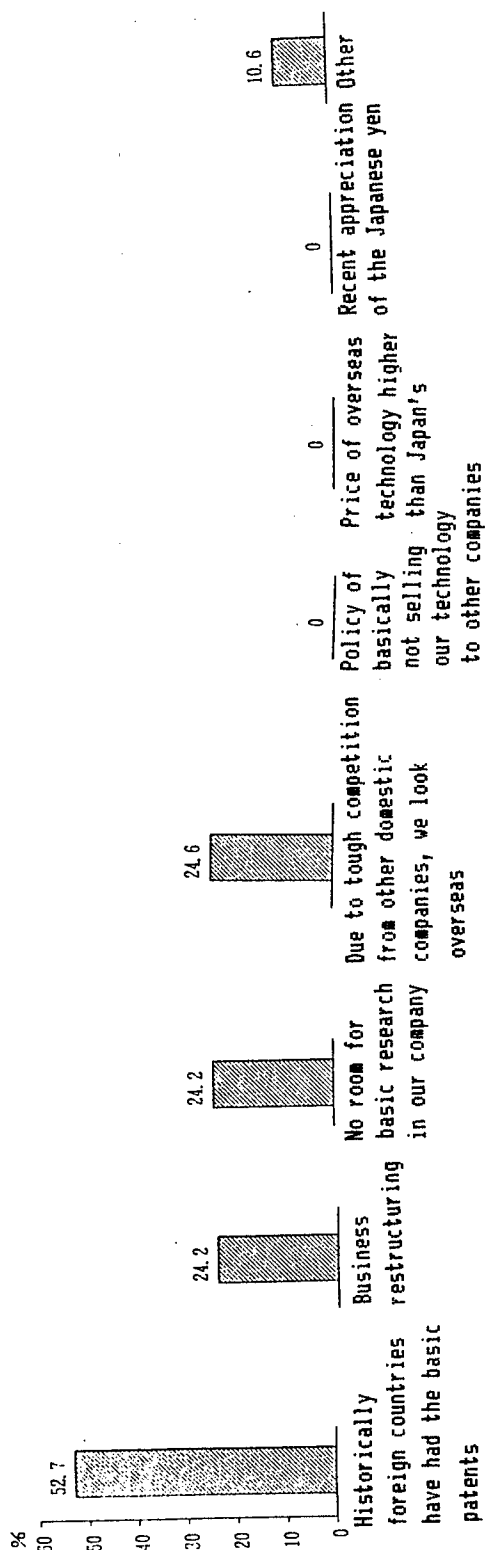
(6) Forms of Technology Trade Transactions

We asked corporations which of five forms ("patents," "know-how," "designs, trademarks," "copyrights," and "other") their technology trade transactions take when they make actual contracts, and in what order are the largest amounts of money paid or received (valid responses from 345 companies made).

In connection with technology exports, 243 companies (70%) said that most of their transactions were in the form of know-how; and 93 companies (27%), patents. Technical guidance and other such exports of technical know-how are more central than patents, which are official intellectual property (Figure 30).

On the other hand, in connection with technology imports, 188 companies (54%) said that more of their transactions were in the form of patents; 146 companies (42%), know-how. In comparison with exports, there are more technology imports involving patents (Figure 31).

Figure 29. Reasons For Unfavorable Technology Trade



(Note: Based on multiple answers.)

Figure 30. Technology Exports

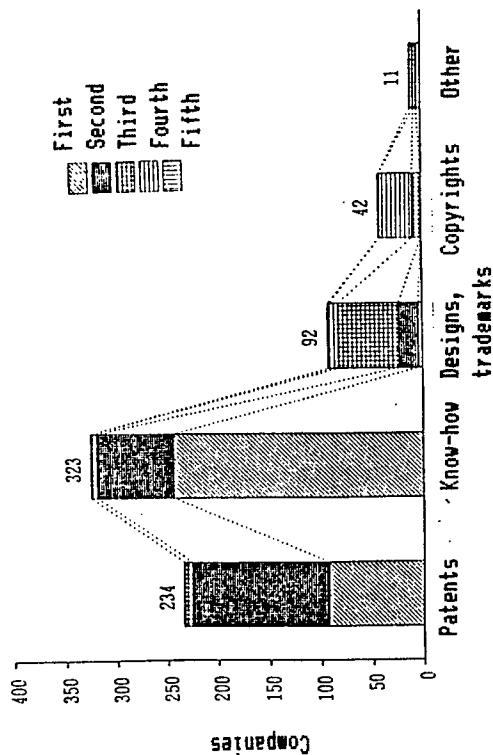
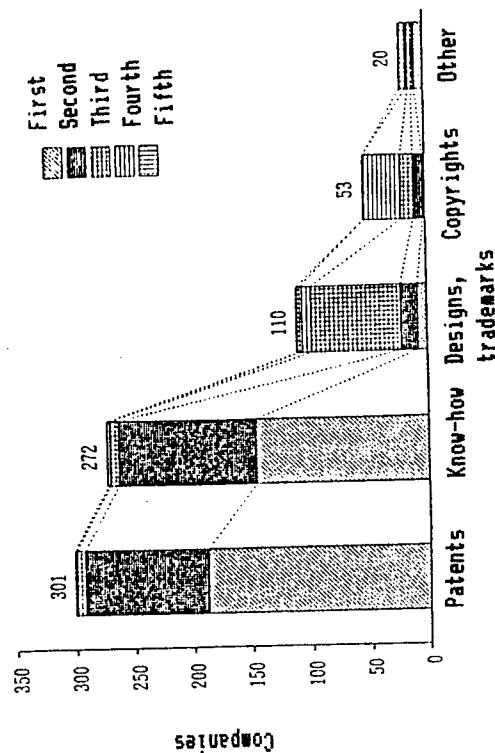


Figure 31. Technology Imports



IV. Aggregate Results of Survey

I. Summary of Corporations That Responded To Survey

1. Sales and Research Expenditures

Research Expenditures/Sales Table

By type of industry

	A	B	C
Total	1,900,456	5,645,625	2.97
(1) Agriculture, forestry, fisheries	18,253	4,611	.25
(2) Mining	3,572	4,999	1.39
(3) Construction	230,247	144,699	.62
(4) Food products	117,485	130,227	1.10
(5) Textiles	41,786	82,575	1.97
(6) Pulp and paper	21,460	25,893	1.20
(7) Publishing and printing	22,428	31,054	1.38
(8) General chemicals	71,421	326,643	4.57
(9) Oils and paints	9,757	33,756	3.45
(10) Pharmaceuticals	34,065	317,080	9.30
(11) Other chemicals	39,741	151,263	3.80
(12) Petroleum & coal products	91,280	82,851	.90
(13) Plastic products	40,650	141,977	3.49
(14) Rubber products	16,345	67,066	4.10
(15) Ceramics	22,675	86,628	3.82
(16) Steel manufacturing	128,300	291,773	2.27
(17) Nonferrous metals	42,389	92,464	2.18
(18) Metal products	24,573	32,443	1.32
(19) Machinery	56,466	156,393	2.76
(20) Electrical machinery & appliances	220,956	1,093,980	4.95
(21) Communications/electronic/electric instrumentation	95,769	739,070	7.71
(22) Automobiles	236,253	939,019	3.97
(23) Other machinery for transport	36,849	128,916	3.49
(24) Precision machinery	29,152	177,151	6.07
(25) Other mfg. industries	11,382	45,226	3.97
(26) Transportation, communications & public utilities	230,075	308,560	1.34
(27) Other kinds of industries	7,127	9,308	1.30

Research Expenditures/Sales Table

By scale of capitalization

	A	B	C
Total	1,900,456	5,645,625	2.97
(1) 1 - 5 billion yen	281,815	382,412	1.35
(2) 5 - 10 billion yen	142,650	329,131	2.30
(3) 10 - 50 billion yen	527,021	1,528,341	2.89
(4) 50 - 100 billion yen	310,554	878,243	2.82
(5) > 100 billion yen	638,416	2,527,498	3.95

A: Sales

(100 million yen)

B: Research Expenditures

(million yen)

C: Research Expenditures/Sales (%)

2. R&D Expenditures By Nature of R&D

R&D Expenditures By Nature of R&D

By type of industry

Classification	A	B	C	D
Total	5,645,625	374,847	1,099,761	3,536,501
(1) Agriculture, forestry, fisheries	4,611	460	1,727	1,612
(2) Mining	4,999	192	1,203	3,604
(3) Construction	144,699	7,087	28,384	89,824
(4) Food products	130,227	17,768	46,147	63,985
(5) Textiles	82,575	926	4,597	76,828
(6) Pulp and paper	25,893	1,870	5,274	11,693
(7) Publishing and printing	31,054	3,345	9,036	18,673
(8) General chemicals	326,643	38,593	99,364	187,011
(9) Oils and paints	33,756	1,877	10,838	15,277
(10) Pharmaceuticals	317,080	62,546	82,428	166,889
(11) Other chemicals	151,263	19,583	49,734	81,623
(12) Petroleum & coal products	82,851	11,310	22,521	49,032
(13) Plastic products	141,977	2,392	16,460	123,125
(14) Rubber products	67,066	1,658	6,883	25,522
(15) Ceramics	86,628	4,845	20,184	59,540
(16) Steel manufacturing	291,773	27,467	64,469	197,832
(17) Nonferrous metals	92,464	5,395	27,920	57,158
(18) Metal products	32,443	507	4,216	26,993
(19) Machinery	156,393	4,520	23,901	103,907
(20) Electrical machinery & appliances	1,093,980	39,150	191,055	481,410
(21) Communications/electronic/electric instrumentation	739,070	48,465	118,430	553,889
(22) Automobiles	939,019	37,670	113,390	728,415
(23) Other machinery for transport	128,916	6,918	21,025	100,574
(24) Precision machinery	177,151	11,171	36,701	120,341
(25) Other mfg. industries	45,226	873	7,507	16,527
(26) Transportation, communications & public utilities	308,560	17,804	84,536	169,109
(27) Other kinds of industries	9,308	455	1,831	6,108

R&D Expenditures By Nature of R&D

By scale of capitalization

Classification	A	B	C	D
Total	5,645,625	374,847	1,099,761	3,536,501
(1) 1 - 5 billion yen	382,412	17,204	61,077	271,043
(2) 5 - 10 billion yen	329,131	27,904	72,610	201,883
(3) 10 - 50 billion yen	1,528,341	133,202	314,691	944,722
(4) 50 - 100 billion yen	878,243	46,485	204,899	570,274
(5) > 100 billion yen	2,527,498	150,052	446,484	1,548,579

- A: Research expenditures
(million yen)
- B: Basic research expenditures
(million yen)
- C: Applied research expenditures
(million yen)
- D: Developmental research expenditures
(million yen)

3. Numbers of Employees and Full-Time Researchers

Number of Full-Time Researchers/ Number of Employees Table

By type of industry

	A	B	C
Total	3,189,950	189,505	5.94
(1) Agriculture, forestry, fisheries	14,002	235	1.67
(2) Mining	3,562	135	3.79
(3) Construction	277,696	5,117	1.84
(4) Food products	154,638	4,801	3.10
(5) Textiles	44,466	1,297	2.91
(6) Pulp and paper	31,606	1,053	3.33
(7) Publishing and printing	32,926	1,302	3.95
(8) General chemicals	114,230	14,042	12.29
(9) Oils and paints	11,866	1,498	12.62
(10) Pharmaceuticals	88,762	8,614	9.70
(11) Other chemicals	60,021	7,063	11.76
(12) Petroleum & coal products	32,690	1,902	5.81
(13) Plastic products	22,822	1,554	6.80
(14) Rubber products	37,497	2,525	6.73
(15) Ceramics	51,975	2,840	5.46
(16) Steel manufacturing	197,042	5,358	2.71
(17) Nonferrous metals	66,127	2,911	4.40
(18) Metal products	61,414	2,179	3.54
(19) Machinery	139,623	6,563	4.70
(20) Electrical machinery & appliances	336,141	37,695	11.21
(21) Communications/electronic/electric instrumentation	236,048	32,301	13.68
(22) Automobiles	357,248	29,036	8.12
(23) Other machinery for transport	84,373	5,494	6.51
(24) Precision machinery	76,674	8,204	10.69
(25) Other mfg. industries	31,211	1,522	4.87
(26) Transportation, communications & public utilities	608,816	3,826	.62
(27) Other kinds of industries	16,474	438	2.65

Number of Full-Time Researchers/ Number of Employees Table

By scale of capitalization

	A	B	C
Total	3,189,950	189,505	5.94
(1) 1 - 5 billion yen	343,057	17,765	5.17
(2) 5 - 10 billion yen	315,829	15,216	4.81
(3) 10 - 50 billion yen	960,130	61,179	6.37
(4) 50 - 100 billion yen	484,073	29,593	6.11
(5) > 100 billion yen	1,086,861	65,752	6.04

A: Number of employees
(people)

B: Number of full-time researchers
(people)

C: Number of full-time researchers/Number of employees (%)

4. Number of Full-Time Researchers and R&D Expenditures

Research Expenditures/ Number of Full-Time Researchers

By type of industry

	A	B	C
Total	189,505	5,645,625	2,979.14
(1) Agriculture, forestry, fisheries	235	4,611	1,962.12
(2) Mining	135	4,999	3,702.96
(3) Construction	5,117	144,699	2,827.80
(4) Food products	4,801	130,227	2,712.49
(5) Textiles	1,297	82,575	6,366.61
(6) Pulp and paper	1,053	25,893	2,458.97
(7) Publishing and printing	1,302	31,054	2,385.09
(8) General chemicals	14,042	326,643	2,326.18
(9) Oils and paints	1,498	33,756	2,253.40
(10) Pharmaceuticals	8,614	317,080	3,680.98
(11) Other chemicals	7,063	151,263	2,141.62
(12) Petroleum & coal products	1,902	82,851	4,355.99
(13) Plastic products	1,554	141,977	9,136.22
(14) Rubber products	2,525	67,066	2,656.07
(15) Ceramics	2,840	86,628	3,050.28
(16) Steel manufacturing	5,358	291,773	5,445.55
(17) Nonferrous metals	2,911	92,464	3,176.36
(18) Metal products	2,179	32,443	1,488.89
(19) Machinery	6,563	156,393	2,382.94
(20) Electrical machinery & appliances	37,695	1,093,980	2,902.18
(21) Communications/electronic/electric instrumentation	32,301	739,070	2,288.07
(22) Automobiles	29,036	939,019	3,233.98
(23) Other machinery for transport	5,494	128,916	2,346.48
(24) Precision machinery	8,204	177,151	2,159.32
(25) Other mfg. industries	1,522	45,226	2,971.48
(26) Transportation, communications & public utilities	3,826	308,560	8,064.81
(27) Other kinds of industries	438	9,308	2,125.11

Research Expenditures/ Number of Full-Time Researchers

By scale of capitalization

	A	B	C
Total	189,505	5,645,625	2,979.14
(1) 1 - 5 billion yen			
(2) 5 - 10 billion yen	17,765	382,412	2,152.61
(3) 10 - 50 billion yen	15,216	329,131	2,163.05
(4) 50 - 100 billion yen	61,179	1,528,341	2,498.14
(5) > 100 billion yen	29,593	878,243	2,967.73
	65,752	2,527,498	3,843.98

A: Number of employees
(people)

B: Number of full-time researchers
(people)

C: Number of researchers/Number of employees (%)

5. Number of Patents Held and Number of Foreign Researchers

	Number of Patents Held	Number of Patents Held Outside Japan	Number of Foreign Researchers
Total	548,486	231,357	302
By type of industry			
(1) Agriculture, forestry, fisheries	327	53	0
(2) Mining	158	51	0
(3) Construction	10,712	1,835	12
(4) Food products			
(5) Textiles	7,955	3,608	4
(6) Pulp and paper	3,059	1,517	0
(7) Publishing and printing	1,912	649	3
(8) General chemicals	3,726	1,151	1
(9) Oils and paints	58,068	30,363	5
(10) Pharmaceuticals	4,188	1,791	2
(11) Other chemicals	21,468	15,956	23
(12) Petroleum & coal products	14,716	7,047	5
(13) Plastic products	6,151	3,497	9
(14) Rubber products	7,091	1,548	0
(15) Ceramics	4,726	2,429	2
(16) Steel manufacturing	6,505	3,259	0
(17) Nonferrous metals	29,829	10,208	11
(18) Metal products	17,022	5,318	11
(19) Machinery	14,129	11,087	3
(20) Electrical machinery & appliances	23,366	7,119	82
(21) Communications/electronic/electric instrumentation	136,798	49,243	36
(22) Automobiles	62,469	23,634	25
(23) Other machinery for transport	40,844	19,342	16
(24) Precision machinery	18,004	5,789	15
(25) Other mfg. industries	34,329	19,367	13
(26) Transportation, communications & public utilities	5,686	2,459	3
(27) Other kinds of industries	14,342	2,905	21
	906	132	0
By scale of capitalization			
(1) 1 - 5 billion yen			
(2) 5 - 10 billion yen	39,899	13,689	14
(3) 10 - 50 billion yen	52,206	24,358	17
(4) 50 - 100 billion yen	160,444	71,808	152
(5) > 100 billion yen	101,024	45,779	40
	194,913	75,723	79

Consumption Tax Financial Processing

By type of industry	A	B	C	D	
Corporations that responded	837	728	628	100	
Frequency (total value) / distribution ratio	837	728.00	628	86.26	100 13.74
(1) Agriculture, forestry, fisheries	7	7	5	71.43	2 28.57
(2) Mining	4	4	4	100.00	0 0.00
(3) Construction	87	74	67	90.54	7 9.46
(4) Food products	55	45	38	84.44	7 15.56
(5) Textiles	21	19	19	100.00	0 0.00
(6) Pulp and paper	15	11	10	90.91	1 9.09
(7) Publishing and printing	6	6	6	100.00	0 0.00
(8) General chemicals	63	53	43	81.13	10 18.87
(9) Oils and paints	13	9	8	88.89	1 11.11
(10) Pharmaceuticals	37	34	29	85.29	5 14.71
(11) Other chemicals	41	40	34	85.00	6 15.00
(12) Petroleum & coal products	20	18	17	94.44	1 5.56
(13) Plastic products	15	15	12	80.00	3 20.00
(14) Rubber products	8	7	5	71.43	2 28.57
(15) Ceramics	27	27	22	81.48	5 18.52
(16) Steel manufacturing	43	36	30	83.33	6 16.67
(17) Nonferrous metals	31	26	25	96.15	1 3.85
(18) Metal products	32	27	24	88.89	3 11.11
(19) Machinery	64	51	42	82.35	9 17.65
(20) Electrical machinery & appliances	78	72	60	83.33	12 16.67
(21) Communications/electronic/electric instrumentation	37	30	28	93.33	2 6.67
(22) Automobiles	45	39	33	84.62	6 15.38
(23) Other machinery for transport	21	20	15	75.00	5 25.00
(24) Precision machinery	19	18	18	100.00	0 0.00
(25) Other mfg. industries	12	9	9	100.00	0 0.00
(26) Transportation, communications & public utilities	25	21	16	76.19	5 23.81
(27) Other kinds of industries	11	10	9	90.00	1 10.00

Consumption Tax Financial Processing

By scale of capitalization	A	B	C	D	
Corporations that responded	837	728	628	100	
Frequency (total value) / distribution ratio	837	728.00	628	86.26	100 13.74
(1) 1 - 5 billion yen	344	305	271	88.85	34 11.15
(2) 5 - 10 billion yen	177	153	126	82.35	27 17.65
(3) 10 - 50 billion yen	237	204	178	87.25	26 12.75
(4) 50 - 100 billion yen	45	40	34	85.00	6 15.00
(5) > 100 billion yen	34	26	19	73.08	7 26.92

A: Corporations that responded

B: Frequency (total value)

C: Not including tax

D: Including tax

II. New Demands on R&D Activities

Question 1. R&D Directions During the 1990s

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	834	305	435	80	3	11
Frequency (total value) / distribution ratio	837	1489.00	305	36.57	77.82	14.27	4.68
(1) Agriculture, forestry, fisheries	7	13	3	4	57.14	0	0
(2) Mining	4	8	3	2	50.00	2	0
(3) Construction	87	157	10	65	75.58	27	0
(4) Food products	55	96	16	25	47.27	6	2
(5) Textiles	21	39	5	13	71.43	2	2
(6) Pulp and paper	15	25	2	13	86.67	0	0
(7) Publishing and printing	6	11	1	6	100.00	0	1
(8) General chemicals	63	107	26	48	77.42	1	0
(9) Oils and paints	13	24	7	9	69.23	9	0
(10) Pharmaceuticals	37	69	28	18	48.65	1	5
(11) Other chemicals	41	75	20	33	80.49	10	0
(12) Petroleum & coal products	20	34	5	15	75.00	4	1
(13) Plastic products	15	27	3	13	86.67	5	2
(14) Rubber products	8	13	6	5	60.00	2	0
(15) Ceramic	27	47	9	23	85.19	0	0
(16) Steel manufacturing	43	75	15	38	88.37	4	3
(17) Nonferrous metals	31	57	17	25	80.65	6	0
(18) Metal products	32	59	8	27	84.38	2	3
(19) Machinery	64	112	29	57	89.06	4	2
(20) Electrical machinery & appliances	78	137	31	70	89.74	6	0
(21) Communications/electronic instrumentation	37	67	18	32	86.45	6	3
(22) Automobiles	45	86	20	44	84.44	7	0
(23) Other machinery for transport	21	33	7	18	85.71	2	1
(24) Precision machinery	19	34	9	17	89.47	2	5
(25) Other a/c. industries	12	22	3	9	75.00	1	2
(26) Transportation, communications & public utilities	25	46	2	16	64.00	8	0
(27) Other kinds of industries	11	16	2	7	70.00	0	2

R&D Directions During the 1990s

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	834	305	435	80	3	11
Frequency (total value) / distribution ratio	837	1489.00	305	36.57	77.82	14.27	4.68
(1) 1 - 5 billion yen	344	600	127	261	76.32	54	24
(2) 5 - 10 billion yen	177	317	56	147	83.05	28	7
(3) 10 - 50 billion yen	237	425	99	183	77.54	28	6
(4) 50 - 100 billion yen	45	83	14	35	77.78	5	0
(5) > 100 billion yen	34	64	9	23	67.65	4	2

A: Corporations that responded
 B: Frequency (total value)
 C: Adapting to internationalization
 D: Higher-tech technology
 E: Adapting to the realization of an affluent way of life
 F: Research exchange, with universities and national labs
 G: Other

Reasons Why Technology Levels Are Inadequate

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	572	91	244	81	129	27
Frequency (total value) / distribution ratio	837	572.00	91	15.91	42.66	14.16	4.72
(1) Agriculture, forestry, fisheries	7	7	0	0.00	42.86	0.00	14.29
(2) Mining	4	4	0	0.00	25.00	1	0.00
(3) Construction	87	68	15	22.06	38.24	7	2.94
(4) Food products	55	40	4	10.00	47.50	2	2.50
(5) Textiles	17	17	3	17.65	35.29	4	11.76
(6) Pulp and paper	15	7	1	14.29	42.86	1	14.29
(7) Publishing and printing	6	3	0	0.00	0.00	1	0.00
(8) General chemicals	63	31	2	6.45	45.16	5	12.90
(9) Oils and paints	13	9	2	22.22	22.22	1	22.22
(10) Pharmaceuticals	37	26	3	11.54	42.31	7	7.69
(11) Other chemicals	41	28	5	17.86	32.14	8	7.14
(12) Petroleum & coal products	20	16	8	50.00	31.25	0	0.00
(13) Plastic products	15	12	2	16.67	33.33	3	0.00
(14) Rubber products	8	6	1	16.67	33.33	2	0.00
(15) Ceramics	27	18	2	11.11	55.56	2	0.00
(16) Steel manufacturing	43	27	3	11.11	44.44	4	0.00
(17) Nonferrous metals	31	21	4	19.05	61.90	2	0.00
(18) Metal products	32	23	3	13.04	52.17	8	4.35
(19) Machinery	64	46	9	19.57	43.48	9	2.27
(20) Electrical machinery & appliances	78	44	8	18.18	50.00	3	0.00
(21) Communications/electronic/electric instrumentation	37	25	1	4.00	56.00	7	0.00
(22) Automobiles	45	31	5	16.13	38.71	6	3.23
(23) Other machinery for transport	21	15	3	20.00	33.33	6	0.00
(24) Precision machinery	19	14	3	21.43	50.00	2	7.14
(25) Other mfg. industries	12	9	1	11.11	33.33	2	11.11
(26) Transportation, communications & public utilities	25	19	2	10.53	31.58	6	10.53
(27) Other kinds of industries	11	6	1	16.67	50.00	0	33.33

Reasons Why Technology Levels Are Inadequate

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	572	91	244	81	129	27
Frequency (total value) / distribution ratio	837	572.00	91	15.91	42.66	14.16	4.72
(1) 1 - 5 billion yen	344	247	33	13.36	45.34	31	6.48
(2) 5 - 10 billion yen	177	127	23	18.11	42.52	17	1.57
(3) 10 - 50 billion yen	237	150	27	18.00	42.00	24	5.33
(4) 50 - 100 billion yen	45	30	8	26.67	33.33	7	3.33
(5) > 100 billion yen	34	18	0	0.00	27.78	5	0.00

- A: Corporations that responded
- B: Frequency (total value)
- C: Not much need
- D: Lack of specialized researchers
- E: Difficulties in technology development
- F: No problems in existing route
- G: Other

Question 3. Obstacles in Technology Utilization

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	831	78	474	199	68	12
Frequency (total value) / distribution ratio	837	831.00	78	474	199	68	12
(1) Agriculture, forestry, fisheries	7	7	1	14.29	2	28.57	0
(2) Mining	4	4	1	25.00	0	0.00	0
(3) Construction	87	86	16	18.60	12	13.95	1
(4) Food products	55	55	5	9.09	11	20.00	2
(5) Textiles	21	19	1	5.26	6	31.58	0
(6) Pulp and paper	15	15	0	0.00	4	26.67	0
(7) Publishing and printing	6	5	1	20.00	1	20.00	0
(8) General chemicals	63	63	8	12.70	14	22.22	2
(9) Oils and paints	13	13	1	7.69	2	15.38	0
(10) Pharmaceuticals	37	37	3	8.11	7	18.92	0
(11) Other chemicals	41	41	3	7.32	3	7.32	1
(12) Petroleum & coal products	20	20	4	20.00	5	25.00	0
(13) Plastic products	15	15	2	13.33	2	13.33	0
(14) Rubber products	8	8	0	0.00	3	37.50	0
(15) Ceramics	27	27	1	3.70	8	29.63	0
(16) Steel manufacturing	43	42	4	9.52	13	30.93	1
(17) Nonferrous metals	31	31	3	9.68	10	32.26	1
(18) Metal products	32	32	0	0.00	11	34.38	1
(19) Machinery	64	63	6	9.52	18	28.57	0
(20) Electrical machinery & appliances	78	78	5	6.41	19	24.36	0
(21) Communications/electronic/instrumentation	37	37	2	5.41	13	35.14	1
(22) Automobiles	45	45	2	4.44	12	26.67	2
(23) Other machinery for transport	21	21	4	19.05	4	19.05	0
(24) Precision machinery	19	19	2	10.53	4	21.05	0
(25) Other mfg. industries	12	12	0	0.00	5	41.67	0
(26) Transportation, communications & public utilities	25	25	2	8.00	2	8.00	0
(27) Other kinds of industries	11	11	1	9.09	4	36.36	0

Obstacles in Technology Utilization

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	831	78	474	199	68	12
Frequency (total value) / distribution ratio	837	831.00	78	474	199	68	12
(1) 1 - 5 billion yen	344	340	30	8.82	87	25.59	8
(2) 5 - 10 billion yen	177	176	17	9.66	48	27.27	2
(3) 10 - 50 billion yen	237	236	23	9.75	47	19.92	2
(4) 50 - 100 billion yen	45	45	6	13.33	11	24.44	0
(5) > 100 billion yen	34	34	2	5.88	6	17.65	0

A: Corporations that responded

B: Frequency (total value)

C: Often

D: Sometimes

E: Seldom

F: Hardly ever

G: Other

Causes of Obstacles

By type of industry	A	B	C	D	E	F	6
Corporations that responded	837	548	170	322	37	12	7
Frequency (total value) / distribution ratio	837	548.00	170	322	37	12	7
(1) Agriculture, forestry, fisheries	7	5	3	2	0	0	0
(2) Mining	4	4	2	2	0	0	0
(3) Construction	87	69	28	33	2	3	3
(4) Food products	55	36	12	22	2	0	0
(5) Textiles	21	11	3	7	1	0	0
(6) Pulp and paper	15	9	1	7	1	0	0
(7) Publishing and printing	6	4	2	1	1	0	0
(8) General chemicals	63	44	16	25	3	0	0
(9) Oils and paints	13	11	3	7	0	1	0
(10) Pharmaceuticals	37	24	14	9	0	0	1
(11) Other chemicals	41	30	13	16	1	0	0
(12) Petroleum & coal products	20	15	5	8	0	2	0
(13) Plastic products	15	11	0	11	0	0	0
(14) Rubber products	8	5	2	2	0	0	0
(15) Ceramics	27	16	2	11	3	0	0
(16) Steel manufacturing	43	23	2	19	2	0	0
(17) Nonferrous metals	31	16	3	12	0	1	0
(18) Metal products	32	18	3	10	0	0	0
(19) Machinery	64	35	5	24	5	0	0
(20) Electrical machinery & appliances	78	52	19	27	4	1	1
(21) Communications/electronic/electric instrumentation	37	20	5	12	3	0	0
(22) Automobiles	45	29	5	21	2	0	1
(23) Other machinery for transport	21	17	5	12	0	0	0
(24) Precision machinery	19	12	3	8	1	0	0
(25) Other eng. industries	12	6	3	3	0	0	0
(26) Transportation, communications & public utilities	25	21	9	10	1	1	0
(27) Other kinds of industries	11	5	2	1	0	2	0

Causes of Obstacles

By scale of capitalization	A	B	C	D	E	F	6
Corporations that responded	837	548	170	322	37	12	7
Frequency (total value) / distribution ratio	837	548.00	170	322	37	12	7
(1) 1 - 5 billion yen	344	211	66	119	17	8	1
(2) 5 - 10 billion yen	177	112	33	67	10	0	2
(3) 10 - 50 billion yen	237	168	45	111	6	3	3
(4) 50 - 100 billion yen	45	31	12	15	3	0	1
(5) > 100 billion yen	34	26	14	10	1	1	0

A: Corporations that responded
 B: Frequency (total value)
 C: Regulations
 D: Economy
 E: Differences in sense of values
 F: Lack of power in public relations
 6: Other

Question 4. Changes in Consumer Needs (1980s)

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	801	353	131	97	154	6
Frequency (total value) / distribution ratio	837	801.00	353	131	97	154	41
(1) Agriculture, forestry, fisheries	7	7	4	1	2	0	0
(2) Mining	4	4	3	1	0	0	0
(3) Construction	87	80	57	5	0	0	0
(4) Food products	55	55	19	12	5	6	4
(5) Textiles	21	21	8	1	4	8	3
(6) Pulp and paper	15	14	5	1	4	6	1
(7) Publishing and printing	6	6	0	0	1	5	1
(8) General chemicals	63	58	27	0	1	7	1
(9) Oils and paints	13	13	6	13	1	4	0
(10) Pharmaceuticals	37	35	3	2	0	9	0
(11) Other chemicals	41	39	14	6	3	5	1
(12) Petroleum & coal products	20	20	12	2	5	20	5
(13) Plastic products	15	15	7	3	5	10	3
(14) Rubber products	8	8	2	3	4	4	0
(15) Ceramics	27	27	12	3	1	1	0
(16) Steel manufacturing	43	41	19	2	1	12	1
(17) Nonferrous metals	31	29	14	8	3	5	1
(18) Metal products	32	32	11	5	2	8	1
(19) Machinery	64	61	29	6	6	7	1
(20) Electrical machinery & appliances	78	73	25	12	8	6	2
(21) Communications/electronic/electric instrumentation	37	35	14	15	11	16	3
(22) Automobiles	45	44	24	10	5	14	5
(23) Other machinery for transport	21	20	13	8	4	5	1
(24) Precision machinery	19	18	6	1	3	5	3
(25) Other eng. industries	12	11	3	6	0	4	1
(26) Transportation, communications & public utilities	25	25	15	3	1	4	2
(27) Other kinds of industries	11	10	1	2	4	2	0

Changes in Consumer Needs (1980s)

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	801	353	131	97	154	6
Frequency (total value) / distribution ratio	837	801.00	353	131	97	154	41
(1) 1 - 5 billion yen	344	324	144	49	41	65	16
(2) 5 - 10 billion yen	177	171	76	30	24	24	12
(3) 10 - 50 billion yen	237	228	92	39	26	53	10
(4) 50 - 100 billion yen	45	44	22	8	5	5	2
(5) > 100 billion yen	34	34	19	5	1	7	1

- A: Corporations that responded
- B: Frequency (total value)
- C: R&D for cost reduction
- D: Development for mass production
- E: Development for multi-variety, small-volume production
- F: R&D of high-value-added products
- G: Other

Changes in Consumer Needs (1980s)

By type of industry	A	B	C
Corporations that responded	837	801	25
Frequency (total value) / distribution ratio	837	801.00	25
(1) Agriculture, forestry, fisheries	7	7	0
(2) Mining	4	4	0
(3) Construction	87	80	3
(4) Food products	55	55	1
(5) Textiles	21	21	1
(6) Pulp and paper	15	14	1
(7) Publishing and printing	6	6	1
(8) General chemicals	63	58	4
(9) Oils and paints	13	13	0
(10) Pharmaceuticals	37	35	2
(11) Other chemicals	41	39	1
(12) Petroleum & coal products	20	20	0
(13) Plastic products	15	15	0
(14) Rubber products	8	8	0
(15) Ceramics	27	27	4
(16) Steel manufacturing	43	41	0
(17) Nonferrous metals	31	29	0
(18) Metal products	32	32	1
(19) Machinery	64	61	1
(20) Electrical machinery & appliances	78	73	1
(21) Communications/electronic instrumentation	37	35	0
(22) Automobiles	45	44	0
(23) Other machinery for transport	21	20	1
(24) Precision machinery	19	18	0
(25) Other a/c. industries	12	11	0
(26) Transportation, communications & public utilities	25	25	2
(27) Other kinds of industries	11	10	1
			10.00

Changes in Consumer Needs (1980s)

By scale of capitalization	A	B	C
Corporations that responded	837	801	25
Frequency (total value) / distribution ratio	837	801.00	25
(1) 1 - 5 billion yen	344	324	9
(2) 5 - 10 billion yen	177	171	5
(3) 10 - 50 billion yen	237	228	8
(4) 50 - 100 billion yen	45	44	2
(5) > 100 billion yen	34	34	1
			2.94

A: Corporations that responded

B: Frequency (total value)

C: Other

Changes in Consumer Needs (1990s)

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	807	67	11	80	570	50
Frequency (total value) / distribution ratio	837	807.00	67	11	1.36	70.63	6.20
(1) Agriculture, forestry, fisheries	7	7	0	0	0.00	6	0
(2) Mining	4	4	2	0	0.00	0	0
(3) Construction	87	80	7	0	0.00	2	0
(4) Food products	55	55	4	0	0.00	59	5
(5) Textiles	21	21	2	0	0.00	40	2
(6) Pulp and paper	15	15	0	0	4.76	15	0
(7) Publishing and printing	6	6	1	0	0.00	10	2
(8) General chemicals	63	60	3	0	0.00	33	0
(9) Oils and paints	13	13	0	0	0.00	42	1
(10) Pharmaceuticals	37	36	3	0	0.00	10	1
(11) Other chemicals	41	39	1	0	2.56	22	7
(12) Petroleum & coal products	20	20	2	0	0.00	32	1
(13) Plastic products	15	15	1	0	0.00	16	1
(14) Rubber products	8	8	0	0	0.00	13	1
(15) Ceramics	27	27	2	0	0.00	5	1
(16) Steel manufacturing	43	42	3	0	0.00	19	1
(17) Nonferrous metals	31	29	6	2	2.38	29	2
(18) Metal products	32	32	3	0	6.90	18	1
(19) Machinery	64	61	7	0	0.00	23	2
(20) Electrical machinery & appliances	78	73	5	2	1.64	39	6
(21) Communications/electronic/electric instrumentation	37	36	4	0	2.74	52	6
(22) Automobiles	45	44	4	0	0.00	27	3
(23) Other machinery for transport	21	20	0	0	4.55	28	2
(24) Precision machinery	19	18	1	0	0.00	15	1
(25) Other mfg. industries	12	11	0	0	0.00	13	2
(26) Transportation, communications & public utilities	25	25	5	0	0.00	10	0
(27) Other kinds of industries	11	10	1	1	10.00	15	2

Changes in Consumer Needs (1990s)

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	807	67	11	80	570	50
Frequency (total value) / distribution ratio	837	807.00	67	11	1.36	70.63	6.20
(1) 1 - 5 billion yen	344	329	34	7	2.13	234	16
(2) 5 - 10 billion yen	177	171	15	1	0.58	116	10
(3) 10 - 50 billion yen	237	229	13	3	1.31	164	19
(4) 50 - 100 billion yen	45	44	1	0	0.00	34	3
(5) > 100 billion yen	34	34	4	0	11.76	22	2

- A: Corporations that responded
- B: Frequency (total value)
- C: R&D for cost reduction
- D: Development for mass production
- E: Development for multi-variety, small-volume production
- F: R&D of high-value-added products
- G: Other

Changes in Consumer Needs (1990s)

By type of industry	A	B	C
Corporations that responded	837	807	29
Frequency (total value) / distribution ratio	837	807.00	29
(1) Agriculture, forestry, fisheries	7	7	0
(2) Mining	4	4	0
(3) Construction	87	80	6
(4) Food products	55	55	0
(5) Textiles	21	21	1
(6) Pulp and paper	15	15	1
(7) Publishing and printing	6	6	0
(8) General chemicals	63	60	4
(9) Oils and paints	13	13	0
(10) Pharmaceuticals	37	36	2
(11) Other chemicals	41	39	0
(12) Petroleum & coal products	20	20	1
(13) Plastic products	15	15	0
(14) Rubber products	8	8	0
(15) Ceramics	27	27	3
(16) Steel manufacturing	43	42	1
(17) Nonferrous metals	31	29	0
(18) Metal products	32	32	0
(19) Machinery	64	61	2
(20) Electrical machinery & appliances	78	73	2
(21) Communications/electronic/electric instrumentation	37	36	1
(22) Automobiles	45	44	1
(23) Other machinery for transport	21	20	1
(24) Precision machinery	19	18	0
(25) Other efg. industries	12	11	0
(26) Transportation, communications & public utilities	25	25	2
(27) Other kinds of industries	11	10	1
			10.00

Changes in Consumer Needs (1990s)

By scale of capitalization	A	B	C
Corporations that responded	837	807	29
Frequency (total value) / distribution ratio	837	807.00	29
(1) 1 - 5 billion yen	344	329	9
(2) 5 - 10 billion yen	177	171	8
(3) 10 - 50 billion yen	237	229	8
(4) 50 - 100 billion yen	45	44	2
(5) > 100 billion yen	34	34	2
			5.88

A: Corporations that responded
B: Frequency (total value)
C: Other

Question 5. R&D for Aiding the Elderly and Disabled

By type of industry	A	B	C	D
Corporations that responded	837	831	263	568
Frequency (total value) / distribution ratio	837	831.00	263	568
(1) Agriculture, forestry, fisheries	7	7	5	2
(2) Mining	4	4	1	3
(3) Construction	87	86	24	62
(4) Food products	55	55	30	25
(5) Textiles	21	21	8	13
(6) Pulp and paper	15	15	2	13
(7) Publishing and printing	6	6	3	3
(8) General chemicals	63	63	21	42
(9) Oils and paints	13	13	5	8
(10) Pharmaceuticals	37	37	29	8
(11) Other chemicals	41	40	12	28
(12) Petroleum & coal products	20	20	2	18
(13) Plastic products	15	15	6	9
(14) Rubber products	8	8	3	5
(15) Ceramics	27	27	8	19
(16) Steel manufacturing	43	43	8	35
(17) Nonferrous metals	31	31	3	28
(18) Machinery	32	32	2	30
(19) Electrical machinery & appliances	64	61	13	48
(20) Communications/electronic/electric instrumentation	78	77	19	58
(21) Automobiles	37	37	10	27
(22) Other machinery for transport	45	45	16	29
(23) Precision machinery	21	21	10	11
(24) Other mfg. industries	19	19	4	8
(25) Transportation, communications & public utilities	12	12	7	18
(26) Other kinds of industries	25	25	2	9
	11	11		

R&D for Aiding the Elderly and Disabled

By scale of capitalization	A	B	C	D
Corporations that responded	837	831	263	568
Frequency (total value) / distribution ratio	837	831.00	263	568
(1) 1 - 5 billion yen	344	338	73	265
(2) 5 - 10 billion yen	177	177	39	138
(3) 10 - 50 billion yen	237	237	102	135
(4) 50 - 100 billion yen	45	45	23	22
(5) > 100 billion yen	34	34	26	8

A: Corporations that responded

B: Frequency (total value)

C: Are tackling it

D: Are not tackling it

Assisting Elderly and Disabled People

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	263	54	26	51	67	65
Frequency (total value) / distribution ratio	837	263.00	54	20.53	9.89	25.48	24.71
(1) Agriculture, forestry, fisheries	7	5	0	0.00	0	0.00	2
(2) Mining	4	1	1	100.00	0	0.00	0
(3) Construction	87	24	4	16.67	1	4.17	0
(4) Food products	55	30	0	0.00	0	0.00	18
(5) Textiles	21	8	2	25.00	3	3.33	1
(6) Pulp and paper	15	2	0	0.00	0	0.00	0
(7) Publishing and printing	6	3	0	0.00	0	0.00	1
(8) General chemicals	63	21	2	9.52	1	33.33	1
(9) Oils and paints	13	5	1	20.00	8	38.10	3
(10) Pharmaceuticals	37	30	1	3.33	0	0.00	14
(11) Other chemicals	41	12	1	8.33	15	50.00	3
(12) Petroleum & coal products	20	2	2	100.00	1	8.33	10
(13) Plastic products	15	6	1	16.67	0	0.00	4
(14) Rubber products	8	3	2	66.67	0	0.00	1
(15) Ceramics	27	8	2	25.00	1	33.33	1
(16) Steel manufacturing	43	8	1	12.50	0	0.00	0
(17) Nonferrous metals	31	3	2	66.67	0	0.00	0
(18) Metal products	32	1	0	0.00	0	0.00	0
(19) Machinery	64	12	4	33.33	1	16.67	1
(20) Electrical machinery & appliances	37	10	4	5.00	8	25.00	3
(21) Communications/electronic/electric instrumentation	45	16	11	40.00	0	0.00	4
(22) Automobiles	21	10	8	68.75	2	20.00	15
(23) Other machinery for transport	19	10	1	80.00	0	0.00	4
(24) Precision machinery	12	4	1	10.00	1	12.50	2
(25) Other mfg. industries	25	7	1	25.00	3	10.00	0
(26) Transportation, communications & public utilities	11	2	2	28.57	0	0.00	3
(27) Other kinds of industries	11	2	0	0.00	0	0.00	5

Assisting Elderly and Disabled People

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	263	54	26	51	67	65
Frequency (total value) / distribution ratio	837	263.00	54	20.53	9.89	25.48	24.71
(1) 1 - 5 billion yen	344	73	16	21.92	3	4.11	22
(2) 5 - 10 billion yen	177	40	14	35.00	3	7.50	15
(3) 10 - 50 billion yen	237	101	16	15.84	15	14.85	22
(4) 50 - 100 billion yen	45	23	4	17.39	3	17.39	6
(5) > 100 billion yen	34	26	4	15.38	2	26.92	9

A: Corporations that responded

B: Frequency (total value)

C: Walking, movement, and nursing aids

D: Artificial bones and organs

E: Medical examination and treatment equipment

F: Health apparatuses and health food

G: Other

Question 6. R&D For Health Maintenance and Promotion

By type of industry	A	B	C	D
Corporations that responded	837	832	256	576
Frequency (total value) / distribution ratio	837	832.00	256	576
(1) Agriculture, forestry, fisheries	7	7	6	1
(2) Mining	4	4	0	4
(3) Construction	87	86	16	70
(4) Food products	55	55	52	3
(5) Textiles	21	21	9	12
(6) Pulp and paper	15	15	3	12
(7) Publishing and printing	6	6	2	4
(8) General chemicals	63	63	24	39
(9) Oils and paints	13	13	5	8
(10) Pharmaceuticals	37	37	30	7
(11) Other chemicals	41	40	17	23
(12) Petroleum & coal products	20	20	4	16
(13) Plastic products	15	15	4	11
(14) Rubber products	8	8	2	6
(15) Ceramics	27	27	5	22
(16) Steel manufacturing	43	43	6	37
(17) Nonferrous metals	31	31	3	28
(18) Metal products	32	32	4	28
(19) Machinery	64	62	7	55
(20) Electrical machinery & appliances	78	77	20	57
(21) Communications/electronic/electric instrumentation	37	37	6	31
(22) Automobiles	45	45	6	39
(23) Other machinery for transport	21	21	7	14
(24) Precision machinery	19	19	7	12
(25) Other eq. industries	12	12	6	6
(26) Transportation, communications & public utilities	25	25	2	23
(27) Other kinds of industries	11	11	3	8

R&D For Health Maintenance and Promotion

By scale of capitalization	A	B	C	D
Corporations that responded	837	832	256	576
Frequency (total value) / distribution ratio	837	832.00	256	576
(1) 1 - 5 billion yen	344	339	73	266
(2) 5 - 10 billion yen	177	177	48	129
(3) 10 - 50 billion yen	237	237	98	139
(4) 50 - 100 billion yen	45	45	20	23
(5) > 100 billion yen	34	34	17	17

A: Corporations that responded

B: Frequency (total value)

C: Are carrying out

D: Are not carrying out

Areas of Health Maintenance and Promotion R&D

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	247	124	34	35	54	
Frequency (total value) / distribution ratio	837	247.00	124	34	35	54	21.86
(1) Agriculture, forestry, fisheries	7	6	6	0	0.00	0	0.00
(2) Mining	4	0	0	0	0.00	0	0.00
(3) Construction	87	13	2	1	7.69	0	0.00
(4) Food products	55	52	52	0	0.00	10	76.92
(5) Textiles	21	9	2	2	22.22	0	0.00
(6) Pulp and paper	15	3	2	2	22.22	3	33.33
(7) Publishing and printing	6	2	1	0	0.00	1	33.33
(8) General chemicals	63	25	15	3	50.00	0	0.00
(9) Oils and paints	13	5	4	0	12.00	6	24.00
(10) Pharmaceuticals	37	29	18	4	0.00	1	20.00
(11) Other chemicals	41	16	7	4	13.79	7	24.14
(12) Petroleum & coal products	20	4	3	0	25.00	0	0.00
(13) Plastic products	15	4	0	0	0.00	5	31.25
(14) Rubber products	8	2	0	0	0.00	1	25.00
(15) Ceramics	27	5	1	1	100.00	0	0.00
(16) Steel manufacturing	43	6	2	0	20.00	2	40.00
(17) Nonferrous metals	31	3	1	0	0.00	4	66.67
(18) Metal products	32	2	1	0	0.00	0	0.00
(19) Machinery	64	7	2	2	28.57	1	14.29
(20) Electrical machinery & appliances	78	18	0	8	44.44	2	28.57
(21) Communications/electronic/electric instrumentation	37	6	0	2	33.33	3	16.67
(22) Automobiles	45	5	0	0	0.00	1	16.67
(23) Other machinery for transport	21	8	2	0	60.00	2	40.00
(24) Precision machinery	19	7	0	1	12.50	0	0.00
(25) Other mfg. industries	12	5	1	6	85.71	0	0.00
(26) Transportation, communications & public utilities	25	3	2	0	0.00	1	14.29
(27) Other kinds of industries	11	2	0	0	40.00	2	40.00
					0.00	1	33.33
					50.00	1	50.00

Areas of Health Maintenance and Promotion R&D

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	247	124	34	35	54	
Frequency (total value) / distribution ratio	837	247.00	124	34	35	54	21.86
(1) 1 - 5 billion yen	344	69	39	7	10.14	16	23.19
(2) 5 - 10 billion yen	177	47	24	7	14.89	8	17.02
(3) 10 - 50 billion yen	237	95	42	16	16.84	21	22.11
(4) 50 - 100 billion yen	45	19	8	2	10.53	6	31.58
(5) > 100 billion yen	34	17	11	2	11.76	3	17.65

A: Corporations that responded
 B: Frequency (total value)
 C: Health foods, health drinks
 D: Health diagnostic equipment
 E: Health maintenance and promotion apparatuses
 F: Other

Question 7. Predicting the Spread of Home Automation

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	829	314	22	99	4	351
Frequency (total value) / distribution ratio	837	829.00	314	37.88	2.65	11.94	42.34
(1) Agriculture, forestry, fisheries	7	7	4	0	0	0	3
(2) Mining	4	4	1	0	0	0	3
(3) Construction	87	86	44	3	13	1	20
(4) Food products	55	54	12	1	5	0	36
(5) Textiles	21	21	9	0	3	0	7
(6) Pulp and paper	15	15	3	0	1	0	10
(7) Publishing and printing	6	6	3	0	1	0	0
(8) General chemicals	63	63	22	1	9	1	30
(9) Oils and paints	13	13	2	0	2	0	9
(10) Pharmaceuticals	37	37	7	0	2	0	24
(11) Other chemicals	41	41	10	0	3	0	24
(12) Petroleum & coal products	20	20	5	0	2	0	12
(13) Plastic products	15	15	9	1	2	0	2
(14) Rubber products	8	8	1	1	2	0	4
(15) Ceramics	27	26	11	1	5	0	9
(16) Steel manufacturing	43	43	6	3	2	0	29
(17) Nonferrous metals	31	31	13	2	3	0	11
(18) Metal products	32	30	10	0	4	0	14
(19) Machinery	64	63	23	0	4	0	28
(20) Electrical machinery & appliances	78	76	44	1	8	1	20
(21) Communications/electronic/electric instrumentation	37	37	22	3	8	0	5
(22) Automobiles	45	45	15	0	8	0	20
(23) Other machinery for transport	21	21	6	0	4	1	10
(24) Precision machinery	19	19	8	0	1	0	9
(25) Other mfg. industries	12	12	9	0	1	0	2
(26) Transportation, communications & public utilities	25	25	12	0	3	0	6
(27) Other kinds of industries	11	11	3	1	1	0	4

Predicting the Spread of Home Automation

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	829	314	22	99	4	351
Frequency (total value) / distribution ratio	837	829.00	314	37.88	2.65	11.94	42.34
(1) 1 - 5 billion yen	344	338	96	8	39	1	174
(2) 5 - 10 billion yen	177	177	59	8	20	2	82
(3) 10 - 50 billion yen	237	236	116	5	28	1	77
(4) 50 - 100 billion yen	45	45	21	1	9	0	10
(5) > 100 billion yen	34	33	20	0	3	0	24

A: Corporations that responded

B: Frequency (total value)

C: It is a big market

D: Cannot expect it to spread because of the small living quarters in Japan

E: It will be popular in special cases such as households where there are elderly people sleeping

F: Desire will wane because of consumer health indications

G: Does not pertain to our company

Predicting the Spread of Home Automation

By type of industry	A	B	C
Corporations that responded	837	829	39
Frequency (total value) / distribution ratio	837	829.00	39
(1) Agriculture, forestry, fisheries	7	7	0
(2) Mining	4	4	0
(3) Construction	87	86	5
(4) Food products	55	54	0
(5) Textiles	21	21	2
(6) Pulp and paper	15	15	0
(7) Publishing and printing	6	6	2
(8) General chemicals	63	63	0
(9) Oils and paints	13	13	0
(10) Pharmaceuticals	37	37	2
(11) Other chemicals	41	41	4
(12) Petroleum & coal products	20	20	1
(13) Plastic products	15	15	1
(14) Rubber products	8	8	0
(15) Ceramics	27	26	0
(16) Steel manufacturing	43	43	3
(17) Nonferrous metals	31	31	2
(18) Metal products	32	30	2
(19) Machinery	64	63	2
(20) Electrical machinery & appliances	78	76	1
(21) Communications/electronic instrumentation	37	37	3
(22) Automobiles	45	45	2
(23) Other machinery for transport	21	21	0
(24) Precision machinery	19	19	1
(25) Other mfg. industries	12	12	0
(26) Transportation, communications & public utilities	25	25	4
(27) Other kinds of industries	11	11	2
			18.18

Predicting the Spread of Home Automation

By scale of capitalization	A	B	C
Corporations that responded	837	829	39
Frequency (total value) / distribution ratio	837	829.00	39
(1) 1 - 5 billion yen	344	338	20
(2) 5 - 10 billion yen	177	177	6
(3) 10 - 50 billion yen	237	236	9
(4) 50 - 100 billion yen	45	45	2
(5) > 100 billion yen	34	33	2
			6.06

A: Corporations that responded
B: Frequency (total value)
C: Other

Question 8. Technology For Urban Cultivation

By type of industry	A	B	C	D
Corporations that responded	837	832	381	451
Frequency (total values) / distribution ratio	837	832.00	381	451
(1) Agriculture, forestry, fisheries	7	7	3	4
(2) Mining	4	4	4	0
(3) Construction	87	86	73	13
(4) Food products	55	55	6	49
(5) Textiles	21	21	6	15
(6) Pulp and paper	15	15	3	12
(7) Publishing and printing	6	5	2	3
(8) General chemicals	63	63	25	38
(9) Oils and paints	13	13	5	8
(10) Pharmaceuticals	37	37	2	35
(11) Other chemicals	41	40	11	29
(12) Petroleum & coal products	20	20	9	11
(13) Plastic products	15	15	7	8
(14) Rubber products	8	8	4	4
(15) Ceramics	27	27	17	10
(16) Steel manufacturing	43	43	15	28
(17) Nonferrous metals	31	31	10	21
(18) Metal products	32	32	18	14
(19) Machinery	64	63	32	31
(20) Electrical machinery & appliances	78	77	36	41
(21) Communications/electronic/electric instrumentation	37	37	18	19
(22) Automobiles	45	45	25	20
(23) Other machinery for transport	21	21	13	8
(24) Precision machinery	19	19	5	14
(25) Other a/g. industries	12	12	7	5
(26) Transportation, communications & public utilities	25	25	21	16
(27) Other kinds of industries	11	11	4	7

Technology For Urban Cultivation

[illegible]

A: Corporations that responded
B: Frequency (total value)
C: Are carrying out
D: Are not carrying out

Areas of R&D for Urban Cultivation

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	386	61	76	150	39	5
Frequency (total value) / distribution ratio	837	386.00	61	15.80	19.69	38.86	1.30
(1) Agriculture, forestry, fisheries	7	3	0	0.00	33.33	33.33	0
(2) Mining	4	4	0	0.00	25.00	50.00	0
(3) Construction	87	74	4	5.41	58.11	16.22	0
(4) Food products	55	6	0	0.00	16.67	33.33	2
(5) Textiles	21	7	0	0.00	14.29	42.86	0
(6) Pulp and paper	15	3	0	0.00	0.00	66.67	0
(7) Publishing and printing	6	2	0	0.00	0.00	0.00	0
(8) General chemicals	63	27	0	0.00	18.52	62.96	1
(9) Dyes and pigments	13	5	0	0.00	0.00	20.00	0
(10) Pharmaceuticals	37	2	0	0.00	0.00	50.00	0
(11) Other chemicals	41	11	2	18.18	0.00	45.45	0
(12) Petroleum & coal products	20	9	0	0.00	0.00	33.33	0
(13) Plastic products	15	7	1	14.29	0.00	71.43	0
(14) Rubber products	8	4	1	25.00	0.00	0.00	0
(15) Ceramics	27	17	0	0.00	50.00	0.00	0
(16) Steel manufacturing	43	16	2	12.50	7	43.75	1
(17) Nonferrous metals	31	10	3	30.00	3	6.25	0
(18) Metal products	32	18	2	11.11	3	10.00	0
(19) Machinery	64	31	2	6.45	19	50.00	1
(20) Electrical machinery & appliances	78	36	16	44.44	8	16.67	0
(21) Communications/electronic/electric instrumentation	37	19	11	57.89	0	31.58	0
(22) Automobiles	45	24	5	20.83	19	79.17	0
(23) Other machinery for transport	21	13	2	15.38	8	61.54	0
(24) Precision machinery	19	6	3	50.00	0	0.00	0
(25) Other mfg. industries	12	7	0	0.00	28.57	42.86	0
(26) Transportation, communications & public utilities	25	21	7	33.33	5	23.81	0
(27) Other kinds of industries	11	4	0	0.00	0.00	25.00	0

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	386	61	76	150	39	5
Frequency (total value) / distribution ratio	837	386.00	61	15.80	19.69	38.86	1.30
(1) 1 - 5 billion yen	344	130	20	15.38	21	40.77	4
(2) 5 - 10 billion yen	177	69	9	13.04	15	39.13	0
(3) 10 - 50 billion yen	237	124	13	10.48	28	43.55	1
(4) 50 - 100 billion yen	45	34	10	29.41	9	29.41	0
(5) > 100 billion yen	34	29	9	31.03	3	20.69	0

A: Corporations that responded

B: Frequency (total value)

C: Traffic system control and advanced information systems

D: Technology for building high-rise living spaces, utilization of deep underground spaces

E: Controlling exhaust gas and noise pollution, wastewater treatment, and waste treatment

F: Stable supply of energy and food

G: Preventing natural disasters

Areas of R&D for Urban Cultivation

By type of industry	A	B	C
Corporations that responded	837	386	55
Frequency (total value) / distribution ratio	837	386.00	55 14.25
(1) Agriculture, forestry, fisheries	7	3	0
(2) Mining	4	4	0
(3) Construction	87	74	9
(4) Food products	55	6	0
(5) Textiles	21	7	2
(6) Pulp and paper	15	3	1
(7) Publishing and printing	6	2	2
(8) General chemicals	63	27	4
(9) Oils and paints	13	5	4
(10) Pharmaceuticals	37	2	1
(11) Other chemicals	41	11	4
(12) Petroleum & coal products	20	9	0
(13) Plastic products	15	7	1
(14) Rubber products	8	4	0
(15) Ceramics	27	17	4
(16) Steel manufacturing	43	16	3
(17) Nonferrous metals	31	10	0
(18) Metal products	32	18	2
(19) Machinery	64	31	3
(20) Electrical machinery & appliances	78	36	6
(21) Communications/electronic/electric instrumentation	37	19	2
(22) Automobiles	45	24	0
(23) Other machinery for transport	21	13	0
(24) Precision machinery	19	6	3
(25) Other mfg. industries	12	7	2
(26) Transportation, communications & public utilities	25	21	1
(27) Other kinds of industries	11	4	1

Areas of R&D for Urban Cultivation

By scale of capitalization	A	B	C
Corporations that responded	837	386	55
Frequency (total value) / distribution ratio	837	386.00	55 14.25
(1) 1 - 5 billion yen	344	130	20
(2) 5 - 10 billion yen	177	69	13
(3) 10 - 50 billion yen	237	124	16
(4) 50 - 100 billion yen	45	34	3
(5) > 100 billion yen	34	29	3

A: Corporations that responded
B: Frequency (total value)
C: Other

Question 9. Consideration Given to Environmental Preservation During Product Design

By type of industry	A	B	C	D	E	F
Corporations that responded	837	828	45	264	416	103
Frequency (total value) / distribution ratio	837	828.00	45	5.43	31.88	50.24
(1) Agriculture, forestry, fisheries	7	7	0	0.00	42.86	57.14
(2) Mining	4	4	0	0.00	25.00	0.00
(3) Construction	87	84	3	3.57	36.90	50.00
(4) Food products	55	55	4	7.27	27.27	19.05
(5) Textiles	21	21	0	0.00	23.81	12.73
(6) Pulp and paper	15	15	6	40.00	40.00	4.76
(7) Publishing and printing	6	6	0	0.00	83.33	0.00
(8) General chemicals	63	63	4	6.35	41.62	16.67
(9) Oils and paints	13	13	0	0.00	53.85	31.75
(10) Pharmaceuticals	37	36	3	8.33	38.46	14.29
(11) Other chemicals	41	41	3	7.32	39.02	7.69
(12) Petroleum & coal products	20	20	1	5.00	35.00	27.78
(13) Plastic products	15	15	0	0.00	66.67	17.07
(14) Rubber products	8	8	0	0.00	33.33	5.00
(15) Ceramics	27	27	1	3.70	55.56	0.00
(16) Steel manufacturing	43	43	3	6.98	25.58	0.00
(17) Nonferrous metals	31	31	2	6.45	51.61	7.41
(18) Metal products	32	32	1	3.13	9.38	18.60
(19) Machinery	64	63	2	3.17	26.98	12.90
(20) Electrical machinery & appliances	78	75	0	0.00	25.33	7.11
(21) Communications/electronic/electric instrumentation	37	37	3	8.11	13.51	11.11
(22) Automobiles	45	44	5	11.36	23.55	5.41
(23) Other machinery for transport	21	21	0	0.00	14.29	4.55
(24) Precision machinery	19	19	1	5.26	36.84	14.29
(25) Other mfg. industries	12	12	0	0.00	41.67	5.26
(26) Transportation, communications & public utilities	25	25	3	12.00	20.00	16.67
(27) Other kinds of industries	11	11	0	0.00	9.09	32.00
					81.82	9.09

Consideration Given to Environmental Preservation During Product Design

By scale of capitalization	A	B	C	D	E	F
Corporations that responded	837	828	45	264	416	103
Frequency (total value) / distribution ratio	837	828.00	45	5.43	31.88	50.24
(1) 1 - 5 billion yen	344	339	16	4.72	23.60	12.44
(2) 5 - 10 billion yen	177	175	5	2.86	31.43	13.27
(3) 10 - 50 billion yen	237	236	16	6.78	38.56	23.14
(4) 50 - 100 billion yen	45	45	4	8.89	44.44	11.02
(5) > 100 billion yen	34	33	4	12.12	54.55	11.11
					21.21	12.12

A: Corporations that responded

B: Frequency (total value)

C: Research for all of their products

D: Research for some of their products

E: Little or no research at all

F: Other

Disposal and Re-Use of Products

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	676	157	149	35	113	63
Frequency (total value) / distribution ratio	837	676.00	157	23.22	22.04	16.72	9.32
(1) Agriculture, forestry, fisheries	7	7	2	28.57	42.85	0	1
(2) Mining	4	3	0	0.00	33.33	0	1
(3) Construction	87	64	9	14.06	21.88	0	1
(4) Food products	55	45	8	17.78	17.78	4	15
(5) Textiles	21	20	6	30.00	20.00	4	3
(6) Pulp and paper	15	11	6	54.55	9.09	0	2
(7) Publishing and printing	6	6	1	16.67	50.00	0	0
(8) General chemicals	63	51	8	15.69	27.45	0	1
(9) Oils and paints	13	12	4	33.33	41.67	6	7
(10) Pharmaceuticals	37	24	3	12.50	8.33	2	0
(11) Other chemicals	41	31	6	19.35	19.35	2	3
(12) Petroleum & coal products	20	16	5	31.25	37.50	0	4
(13) Plastic products	15	15	1	6.67	46.67	0	0
(14) Rubber products	8	8	2	25.00	50.00	0	0
(15) Ceramics	27	24	3	12.50	50.00	0	0
(16) Steel manufacturing	43	32	12	37.50	18.75	2	8
(17) Nonferrous metals	31	24	11	45.83	16.67	1	3
(18) Metal products	32	27	10	37.04	11.11	3	2
(19) Machinery	64	52	21	40.38	9.62	6	0
(20) Electrical machinery & appliances	78	68	10	14.71	16.18	1	8
(21) Communications/electronic/instrumentation	37	32	3	9.38	11.11	1	4
(22) Automobiles	45	36	13	36.11	19.44	4	3
(23) Other machinery for transport	21	17	6	35.29	0.00	1	5
(24) Precision machinery	19	17	2	11.76	35.29	4	8
(25) Other a/c. industries	12	10	3	30.00	40.00	0	1
(26) Transportation, communications & public utilities	25	14	0	0.00	57.14	0	0
(27) Other kinds of industries	11	10	2	20.00	10.00	2	2

Disposal and Re-Use of Products

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	676	157	149	35	113	63
Frequency (total value) / distribution ratio	837	676.00	157	23.22	22.04	16.72	9.32
(1) 1 - 5 billion yen	344	278	69	24.82	15.11	46	25
(2) 5 - 10 billion yen	177	144	31	21.53	23.61	33	16
(3) 10 - 50 billion yen	237	194	48	24.74	25.26	30	14
(4) 50 - 100 billion yen	45	34	4	11.76	35.29	4	4
(5) > 100 billion yen	34	26	5	19.23	46.15	0	4

A: Corporations that responded

B: Frequency (total value)

C: Processing or re-utilization methods have already been established

D: Research on disposal and recycling should be done in our company

E: The firms that produced the raw materials should handle it

F: Our hands are full with research related to products or competitive strength

G: The government should develop the technology and take care of disposal (re-use)

Disposal and Re-Use of Products

By type of industry	A	B	C	D
Corporations that responded	837	676	77	82
Frequency (total value) / distribution ratio	837	676.00	77	11.39
(1) Agriculture, forestry, fisheries	7	7	1	14.29
(2) Mining	4	3	1	33.33
(3) Construction	87	64	6	9.38
(4) Food products	55	45	6	13.33
(5) Textiles	21	20	0	0.00
(6) Pulp and paper	15	11	0	0.00
(7) Publishing and printing	6	6	0	0.00
(8) General chemicals	63	51	6	11.76
(9) Oils and paints	13	12	1	8.33
(10) Pharmaceuticals	37	24	6	25.00
(11) Other chemicals	41	31	3	9.68
(12) Petroleum & coal products	20	16	1	6.25
(13) Plastic products	15	15	0	0.00
(14) Rubber products	8	8	1	12.50
(15) Ceramics	27	24	0	0.00
(16) Steel manufacturing	43	32	5	15.63
(17) Nonferrous metals	31	24	1	4.17
(18) Metal products	32	27	3	11.11
(19) Machinery	64	52	10	19.23
(20) Electrical machinery & appliances	78	68	10	14.71
(21) Communications/electronic/electric instrumentation	37	32	4	12.50
(22) Automobiles	45	36	2	5.56
(23) Other machinery for transport	21	17	4	23.53
(24) Precision machinery	19	17	1	5.88
(25) Other mfg. industries	12	10	1	10.00
(26) Transportation, communications & public utilities	25	14	2	14.29
(27) Other kinds of industries	11	10	2	20.00

Disposal and Re-Use of Products

By scale of capitalization	A	B	C	D
Corporations that responded	837	676	77	82
Frequency (total value) / distribution ratio	837	676.00	77	11.39
(1) 1 - 5 billion yen	344	278	46	16.55
(2) 5 - 10 billion yen	177	144	13	9.03
(3) 10 - 50 billion yen	237	194	14	7.22
(4) 50 - 100 billion yen	45	34	2	5.88
(5) > 100 billion yen	34	26	2	7.69

A: Corporations that responded
 B: Frequency (total value)
 C: Does not apply to our company
 D: Other

Plans To Set Up Exhibition Hall

By type of industry	A	B	C	D	E
Corporations that responded	837	768	9	43	716
Frequency (total value) / distribution ratio	837	768.00	9	1.17	5.60
(1) Agriculture, forestry, fisheries	7	7	0	0.00	28.57
(2) Mining	4	4	0	0.00	0.00
(3) Construction	87	79	1	1.27	11.39
(4) Food products	55	46	0	0.00	4.35
(5) Textiles	21	18	0	0.00	5.56
(6) Pulp and paper	15	12	0	0.00	0.00
(7) Publishing and printing	6	5	0	0.00	40.00
(8) General chemicals	63	61	0	0.00	3.60
(9) Oils and paints	13	11	0	0.00	100.00
(10) Pharmaceuticals	37	33	0	0.00	90.91
(11) Other chemicals	41	41	1	2.44	0.00
(12) Petroleum & coal products	20	18	0	0.00	4.88
(13) Plastic products	15	15	1	6.67	0.00
(14) Rubber products	8	8	0	0.00	18.00
(15) Ceramics	27	24	0	0.00	93.33
(16) Steel manufacturing	43	41	0	0.00	75.00
(17) Nonferrous metals	31	31	0	0.00	6.00
(18) Metal products	32	31	1	3.23	4.17
(19) Machinery	64	58	1	1.72	0.00
(20) Electrical machinery & appliances	78	74	2	2.70	25.00
(21) Communications/electronic/electric instrumentation	37	36	1	2.78	4.05
(22) Automobiles	45	43	0	0.00	5.56
(23) Other machinery for transport	21	20	0	0.00	33.33
(24) Precision machinery	19	16	0	0.00	6.98
(25) Other mfg. industries	12	11	0	0.00	100.00
(26) Transportation, communications & public utilities	25	15	1	6.67	12.50
(27) Other kinds of industries	11	10	0	0.00	9.09
					80.00

Plans To Set Up Exhibition Hall

By scale of capitalization	A	B	C	D	E
Corporations that responded	837	768	9	43	716
Frequency (total value) / distribution ratio	837	768.00	9	1.17	5.60
(1) 1 - 5 billion yen	344	333	2	0.60	4.20
(2) 5 - 10 billion yen	177	166	0	0.00	3.01
(3) 10 - 50 billion yen	237	211	3	1.42	7.11
(4) 50 - 100 billion yen	45	37	2	5.41	16.22
(5) > 100 billion yen	34	21	2	9.52	14.29
					16
					76.19

A: Corporations that responded

B: Frequency (total value)

C: Concrete plans to do so

D: Looking into setting up such a place

E: Not looking into setting up such a place

Contents of the Exhibition Halls

By type of industry	A	B	C	D	E	F
Corporations that responded	837	57	9	28	17	3
Frequency (total value) / distribution ratio	837	57.00	9	15.79	49.12	29.82
(1) Agriculture, forestry, fisheries	7	0	0	0	0	0
(2) Mining	4	0	0	0	0	0
(3) Construction	87	7	0	0	0	0
(4) Food products	55	9	1	3	5	0
(5) Textiles	21	2	1	1	0	0
(6) Pulp and paper	15	2	0	0	2	0
(7) Publishing and printing	6	1	0	0	1	0
(8) General chemicals	63	2	0	2	0	0
(9) Oils and paints	13	1	0	0	1	0
(10) Pharmaceuticals	37	3	1	1	0	1
(11) Other chemicals	41	0	0	0	0	0
(12) Petroleum & coal products	20	2	0	2	0	0
(13) Plastic products	15	0	0	0	0	0
(14) Rubber products	8	0	0	0	0	0
(15) Ceramics	27	2	0	0	1	0
(16) Steel manufacturing	43	2	1	1	0	0
(17) Nonferrous metals	31	0	0	0	0	0
(18) Metal products	32	0	0	0	0	0
(19) Machinery	64	2	0	1	0	1
(20) Electrical machinery & appliances	78	4	0	4	0	0
(21) Communications/electronic/electric instrumentation	37	1	0	1	0	0
(22) Automobiles	45	2	0	1	0	0
(23) Other machinery for transport	21	1	0	1	0	0
(24) Precision machinery	19	2	1	1	0	0
(25) Other eng. industries	12	1	0	0	1	0
(26) Transportation, communications & public utilities	25	10	4	2	4	0
(27) Other kinds of industries	11	1	0	0	1	0

Contents of the Exhibition Halls

By scale of capitalization	A	B	C	D	E	F
Corporations that responded	837	57	9	28	17	3
Frequency (total value) / distribution ratio	837	57.00	9	15.79	49.12	29.82
(1) 1 - 5 billion yen	344	5	1	2	2	0
(2) 5 - 10 billion yen	177	10	2	4	4	0
(3) 10 - 50 billion yen	237	21	2	10	6	3
(4) 50 - 100 billion yen	45	8	0	7	1	0
(5) > 100 billion yen	34	13	4	5	4	0

A: Corporations that responded

B: Frequency (total value)

C: About S&T history and new technology

D: About the company's technology

E: About the industry's technology

F: Other

Years When Exhibition Halls First Opened

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	56	4	3	10	16	23
Frequency (total value) / distribution ratio	837	56.00	4	7.14	5.36	17.86	28.57
(1) Agriculture, forestry, fisheries	7	0	0	0.00	0.00	0.00	0.00
(2) Mining	4	0	0	0.00	0.00	0.00	0.00
(3) Construction	87	7	0	0.00	0.00	0.00	0.00
(4) Food products	55	9	0	0.00	0.00	14.29	85.71
(5) Textiles	21	2	0	0.00	0.00	33.33	11.11
(6) Pulp and paper	15	2	0	0.00	0.00	55.56	0.00
(7) Publishing and printing	6	1	1	50.00	0.00	50.00	0.00
(8) General chemicals	63	2	0	0.00	0.00	0.00	100.00
(9) Oils and paints	13	1	0	0.00	0.00	0.00	50.00
(10) Pharmaceuticals	37	3	0	0.00	0.00	0.00	0.00
(11) Other chemicals	41	0	0	0.00	0.00	0.00	66.67
(12) Petroleum & coal products	20	2	0	0.00	0.00	0.00	0.00
(13) Plastic products	15	0	0	0.00	0.00	0.00	100.00
(14) Rubber products	8	0	0	0.00	0.00	0.00	0.00
(15) Ceramics	27	2	0	0.00	0.00	0.00	0.00
(16) Steel manufacturing	43	2	1	50.00	0.00	50.00	100.00
(17) Nonferrous metals	31	0	0	0.00	0.00	0.00	0.00
(18) Metal products	32	0	0	0.00	0.00	0.00	0.00
(19) Machinery	54	2	0	0.00	0.00	0.00	0.00
(20) Electrical machinery & appliances	78	3	0	0.00	0.00	0.00	50.00
(21) Communications/electronic/electric instrumentation	37	1	0	0.00	0.00	33.33	33.33
(22) Automobiles	45	2	0	0.00	0.00	0.00	100.00
(23) Other machinery for transport	21	1	0	0.00	0.00	0.00	0.00
(24) Precision machinery	19	2	1	50.00	0.00	50.00	0.00
(25) Other mfg. industries	12	1	0	0.00	0.00	0.00	0.00
(26) Transportation, communications & public utilities	25	10	1	10.00	100.00	30.00	30.00
(27) Other kinds of industries	11	1	0	0.00	100.00	0.00	0.00

Years When Exhibition Halls First Opened

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	56	4	3	10	16	23
Frequency (total value) / distribution ratio	837	56.00	4	7.14	5.36	17.86	28.57
(1) 1 - 5 billion yen	344	5	0	0.00	0.00	40.00	40.00
(2) 5 - 10 billion yen	177	10	0	0.00	0.00	20.00	30.00
(3) 10 - 50 billion yen	237	21	3	14.29	9.52	14.29	33.33
(4) 50 - 100 billion yen	45	8	0	0.00	12.50	0.00	75.00
(5) > 100 billion yen	34	12	1	8.33	0.00	25.00	41.67

A: Corporations that responded

B: Frequency (total value)

C: Before 1955

D: 1955-1965

E: 1965-1975

F: 1975-1985

G: Since 1985

Yearly Number of Visitors (January - December 1989)

By type of industry	A	B	C	D	E	F	
Corporations that responded	837	54	18	16	6	5	6
Frequency (total value) / distribution ratio	837	54.00	18	33.33	29.63	11.11	3.70
(1) Agriculture, forestry, fisheries	7	0	0	0.00	0.00	0.00	0.00
(2) Mining	4	0	0	0.00	0.00	0.00	0.00
(3) Construction	87	6	1	16.67	66.67	0.00	0.00
(4) Food products	55	8	3	37.50	12.50	1	16.67
(5) Textiles	21	2	0	0.00	50.00	0	12.50
(6) Pulp and paper	15	1	1	100.00	0.00	0	0.00
(7) Publishing and printing	6	1	0	0.00	100.00	0	0.00
(8) General chemicals	63	2	2	100.00	0.00	0	0.00
(9) Oils and paints	13	1	1	100.00	0.00	0	0.00
(10) Pharmaceuticals	37	3	1	33.33	0.00	1	33.33
(11) Other chemicals	41	0	0	0.00	0.00	0	0.00
(12) Petroleum & coal products	20	2	0	0.00	50.00	0	0.00
(13) Plastic products	15	0	0	0.00	0.00	0	0.00
(14) Rubber products	8	0	0	0.00	0.00	0	0.00
(15) Ceramics	27	2	0	0.00	100.00	0	0.00
(16) Steel manufacturing	43	2	1	50.00	0.00	0	0.00
(17) Nonferrous metals	31	0	0	0.00	0.00	0	0.00
(18) Metal products	32	0	0	0.00	0.00	0	0.00
(19) Machinery	64	2	1	50.00	0.00	0	0.00
(20) Electrical machinery & appliances	78	4	2	50.00	0.00	1	25.00
(21) Communications/electronic/instrumentation	37	1	0	0.00	100.00	0	0.00
(22) Automobiles	45	2	1	50.00	0.00	1	50.00
(23) Other machinery for transport	21	1	0	0.00	100.00	0	0.00
(24) Precision machinery	19	2	2	100.00	0.00	0	0.00
(25) Other a/c. industries	12	1	1	100.00	0.00	0	0.00
(26) Transportation, communications & public utilities	25	10	1	10.00	10.00	0	20.00
(27) Other kinds of industries	11	1	0	0.00	100.00	0	0.00

Yearly Number of Visitors (January - December 1989)

By scale of capitalization	A	B	C	D	E	F	
Corporations that responded	837	54	18	16	6	5	6
Frequency (total value) / distribution ratio	837	54.00	18	33.33	29.63	11.11	3.70
(1) 1 - 5 billion yen	344	5	3	60.00	20.00	0	0.00
(2) 5 - 10 billion yen	177	10	5	50.00	20.00	1	10.00
(3) 10 - 50 billion yen	237	18	9	50.00	33.33	1	5.56
(4) 50 - 100 billion yen	45	8	0	0.00	75.00	1	12.50
(5) > 100 billion yen	34	13	1	7.69	7.69	2	15.38

A: Corporations that responded

B: Frequency (total value)

C: Less than 1,000

D: 1,001 - 5,000

E: 5,001 - 10,000

F: 10,000 - 50,000

G: 50,000 - 100,000

Yearly Number of Visitors (January - December 1989)

By type of industry	A	B	C
Corporations that responded	837	54	7
Frequency (total value) / distribution ratio	837	54.00	7
(1) Agriculture, forestry, fisheries	7	0	0
(2) Mining	4	0	0
(3) Construction	87	6	0
(4) Food products	55	8	1
(5) Textiles	21	2	0
(6) Pulp and paper	15	1	0
(7) Publishing and printing	6	1	0
(8) General chemicals	63	2	0
(9) Oils and paints	13	1	0
(10) Pharmaceuticals	37	3	0
(11) Other chemicals	41	0	0
(12) Petroleum & coal products	20	2	0
(13) Plastic products	15	0	0
(14) Rubber products	8	0	0
(15) Ceramics	27	2	0
(16) Steel manufacturing	43	2	0
(17) Nonferrous metals	31	0	0
(18) Metal products	32	0	0
(19) Machinery	64	2	0
(20) Electrical machinery & appliances	78	4	0
(21) Communications/electronic/electric instrumentation	37	1	0
(22) Automobiles	45	2	0
(23) Other machinery for transport	21	1	0
(24) Precision machinery	19	2	0
(25) Other a/g. industries	12	1	0
(26) Transportation, communications & public utilities	25	10	6
(27) Other kinds of industries	11	1	0
			60.00
			0.00

Yearly Number of Visitors (January - December 1989)

By scale of capitalization	A	B	C
Corporations that responded	837	54	7
Frequency (total value) / distribution ratio	837	54.00	7
(1) 1 - 5 billion yen	344	5	0
(2) 5 - 10 billion yen	177	10	0
(3) 10 - 50 billion yen	237	18	1
(4) 50 - 100 billion yen	45	8	0
(5) > 100 billion yen	34	13	6
			46.15

A: Corporations that responded
B: Frequency (total value)
C: More than 100,000

Question 11. Support of Academic Societies, Etc.

By type of industry	A	B	C	D	E	F	G
Corporations that responded Frequency (total value) / distribution ratio	837 837	833 833.00	254 254	247 247	63 63	167 167	29 29
(1) Agriculture, forestry, fisheries	7	7	1	2	1	14.29	0
(2) Mining	4	4	1	1	2	50.00	0
(3) Construction	87	86	20	18	11	12.79	0
(4) Food products	55	54	21	13	2	3.70	5
(5) Textiles	21	21	6	6	1	4.76	1
(6) Pulp and paper	15	15	4	6	2	13.33	0
(7) Publishing and printing	6	6	3	3	0	0.00	0
(8) General chemicals	63	63	24	16	2	20.63	3
(9) Oils and paints	13	13	6	2	1	23.08	1
(10) Pharmaceuticals	37	37	20	9	4	15.22	1
(11) Other chemicals	41	41	11	12	8	19.51	0
(12) Petroleum & coal products	20	20	7	5	3	15.00	2
(13) Plastic products	15	15	3	1	1	6.67	0
(14) Rubber products	8	8	1	3	1	12.50	0
(15) Ceramics	27	27	8	7	2	7.41	1
(16) Steel manufacturing	43	43	9	13	3	6.98	3
(17) Nonferrous metals	31	31	12	6	2	6.45	0
(18) Metal products	32	32	8	9	3	12.90	3
(19) Machinery	64	63	19	23	4	9.38	4
(20) Electrical machinery & appliances	78	77	22	23	6	6.35	0
(21) Communications/electronic instrumentation	37	37	11	16	3	7.79	0
(22) Automobiles	45	45	10	24	5	8.11	0
(23) Other machinery for transport	21	21	4	8	1	4.44	1
(24) Precision machinery	19	19	5	7	3	4.76	1
(25) Other a/c. industries	12	12	5	4	0	15.79	0
(26) Transportation, communications & public utilities	25	25	12	7	2	8.00	2
(27) Other kinds of industries	11	11	1	3	0	0.00	0

Support of Academic Societies, Etc.

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded Frequency (total value) / distribution ratio	837 837	833 833.00	254 254	247 247	63 63	167 167	29 29
(1) 1 - 5 billion yen	344	342	81	87	34	9.94	12
(2) 5 - 10 billion yen	177	177	53	64	13	7.34	4
(3) 10 - 50 billion yen	237	235	82	75	10	4.26	9
(4) 50 - 100 billion yen	45	45	23	10	4	8.89	2
(5) > 100 billion yen	34	34	15	11	2	5.88	2

- A: Corporations that responded
 B: Frequency (total value)
 C: It is a part of the company's social activities
 D: It is a way of activating research through raising the consciousness of researchers
 E: For the further development of the industry
 F: It is a way of gathering information
 G: It improves the company's image

Support of Academic Societies, Etc.

By type of industry	A	B	C	D
Corporations that responded	837	833	66	7
Frequency (total value) / distribution ratio	837	833.00	66	7.92
(1) Agriculture, forestry, fisheries	7	7	0	0.00
(2) Mining	4	4	0	0.00
(3) Construction	87	86	5	5.81
(4) Food products	55	54	5	9.26
(5) Textiles	21	21	1	4.76
(6) Pulp and paper	15	15	1	6.67
(7) Publishing and printing	6	6	0	0.00
(8) General chemicals	63	63	5	7.94
(9) Oils and paints	13	13	0	0.00
(10) Pharmaceuticals	37	37	0	0.00
(11) Other chemicals	41	41	5	12.20
(12) Petroleum & coal products	20	20	0	0.00
(13) Plastic products	15	15	3	20.00
(14) Rubber products	8	8	2	25.00
(15) Ceramics	27	27	1	3.70
(16) Steel manufacturing	43	43	3	6.98
(17) Nonferrous metals	31	31	4	12.90
(18) Metal products	32	32	5	15.63
(19) Machinery	64	63	6	9.52
(20) Electrical machinery & appliances	78	77	7	9.09
(21) Communications/electronic/electric instrumentation	37	37	2	5.41
(22) Automobiles	45	45	3	6.67
(23) Other machinery for transport	21	21	4	19.05
(24) Precision machinery	19	19	1	5.26
(25) Other eng. industries	12	12	1	8.33
(26) Transportation, communications & public utilities	25	25	2	8.00
(27) Other kinds of industries	11	11	0	0.00

Support of Academic Societies, Etc.

By scale of capitalization	A	B	C	D
Corporations that responded	837	833	66	7
Frequency (total value) / distribution ratio	837	833.00	66	7.92
(1) 1 - 5 billion yen	344	342	48	14.04
(2) 5 - 10 billion yen	177	177	13	7.34
(3) 10 - 50 billion yen	237	235	4	1.70
(4) 50 - 100 billion yen	45	45	1	2.22
(5) > 100 billion yen	34	34	0	0.00

A: Corporations that responded
 B: Frequency (total value)
 C: We do not carry out such support
 D: Other

Question 12. Technical Fields of Personnel Employed

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	830	313	305	81	22	3
Frequency (total value) / distribution ratio	837	830.00	313	37.71	36.75	2.65	0.36
(1) Agriculture, forestry, fisheries	7	7	1	14.29	28.57	1	0
(2) Mining	4	4	1	25.00	0.00	0	0.00
(3) Construction	87	85	19	22.35	0.00	0	0.00
(4) Food products	55	55	1	1.82	2.35	6	0.00
(5) Textiles	21	21	7	33.33	47.27	0	0.00
(6) Pulp and paper	15	15	5	33.33	19.05	1	0.00
(7) Publishing and printing	6	6	6	100.00	6.67	0	0.00
(8) General chemicals	63	63	7	11.11	0.00	0	0.00
(9) Oils and paints	13	13	2	15.38	4.76	2	0.00
(10) Pharmaceuticals	37	37	1	2.70	7.69	0	0.00
(11) Other chemicals	41	41	6	14.63	81.08	0	0.00
(12) Petroleum & coal products	20	20	2	10.00	7.32	0	0.00
(13) Plastic products	15	15	5	33.33	0.00	1	0.00
(14) Rubber products	8	8	0	0.00	0.00	0	0.00
(15) Ceramics	27	27	6	22.22	0.00	0	0.00
(16) Steel manufacturing	43	42	7	16.67	4.76	0	0.00
(17) Nonferrous metals	31	30	9	30.00	0.00	1	0.00
(18) Metal products	32	32	15	46.88	0.00	0	0.00
(19) Machinery	64	62	45	72.58	0.00	0	0.00
(20) Electrical machinery & appliances	78	77	62	80.52	3.23	5	0.00
(21) Communications/electronic/electric instrumentation	37	37	30	81.08	12.90	1	0.00
(22) Automobiles	45	45	24	53.33	16.22	0	0.00
(23) Other machinery for transport	21	21	15	71.43	33.33	0	0.00
(24) Precision machinery	19	19	18	94.74	14.29	0	0.00
(25) Other eng. industries	12	12	5	41.67	5.26	0	0.00
(26) Transportation, communications & public utilities	25	25	11	44.00	0.00	2	8.33
(27) Other kinds of industries	11	11	3	27.27	4.00	1	4.00
					0.00	0	9.09

Technical Fields of Personnel Employed

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	830	313	305	81	22	3
Frequency (total value) / distribution ratio	837	830.00	313	37.71	36.75	2.65	0.36
(1) 1 - 5 billion yen	344	340	100	29.41	41.18	14	1
(2) 5 - 10 billion yen	177	177	74	41.81	37.29	2	0
(3) 10 - 50 billion yen	237	234	97	41.45	33.33	6	2
(4) 50 - 100 billion yen	45	45	23	51.11	24.44	0	0.00
(5) > 100 billion yen	34	34	19	55.88	29.41	0	0.00

- A: Corporations that responded
- B: Frequency (total value)
- C: Information, electronics, software
- D: Substances, materials, processing
- E: Life sciences
- F: Environmental preservation, pollution prevention
- G: Lifestyle, education, culture

Technical Fields of Personnel Employed

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	830	4	3	56	2	41
Frequency (total value) / distribution ratio	837	830.00	4	0.48	0.36	6.75	0.24
(1) Agriculture, forestry, fisheries	7	7	0	0.00	0.00	14.29	0.00
(2) Mining	4	4	0	0.00	0.00	0.00	0.00
(3) Construction	87	85	0	0.00	1.18	52.94	1.18
(4) Food products	55	55	0	0.00	0.00	0.00	5.88
(5) Textiles	21	21	0	0.00	0.00	0.00	10.91
(6) Pulp and paper	15	15	0	0.00	0.00	0.00	0.00
(7) Publishing and printing	6	6	0	0.00	0.00	0.00	6.67
(8) General chemicals	63	63	0	0.00	0.00	0.00	0.00
(9) Oils and paints	13	13	0	0.00	0.00	0.00	11.11
(10) Pharmaceuticals	37	37	0	0.00	0.00	0.00	0.00
(11) Other chemicals	41	41	0	0.00	0.00	0.00	2.70
(12) Petroleum & coal products	20	20	0	0.00	0.00	0.00	14.63
(13) Plastic products	15	15	0	0.00	0.00	0.00	5.00
(14) Rubber products	8	8	0	0.00	0.00	0.00	0.00
(15) Ceramics	27	27	0	0.00	1	12.50	0.00
(16) Steel manufacturing	43	42	0	0.00	3	11.11	0.00
(17) Nonferrous metals	31	30	0	0.00	2	4.76	9.52
(18) Metal products	32	32	0	0.00	0	0.00	3.33
(19) Machinery	64	62	0	0.00	2	6.25	6.25
(20) Electrical machinery & appliances	78	77	0	0.00	1	1.61	1.61
(21) Communications/electronic instrumentation	37	37	0	0.00	1	0.00	0.00
(22) Automobiles	45	45	0	0.00	2	0.00	0.00
(23) Other machinery for transport	21	21	1	4.76	0	0.00	4.44
(24) Precision machinery	19	19	0	0.00	1	4.76	4.76
(25) Other aig. industries	12	12	0	0.00	0	0.00	0.00
(26) Transportation, communications & public utilities	25	25	3	12.00	0	0.00	0.00
(27) Other kinds of industries	11	11	0	0.00	0	0.00	18.18

Technical Fields of Personnel Employed

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	830	4	3	56	2	41
Frequency (total value) / distribution ratio	837	830.00	4	0.48	0.36	6.75	0.24
(1) 1 - 5 billion yen	344	340	1	0.29	0.88	7.94	8.24
(2) 5 - 10 billion yen	177	177	1	0.56	0	6.78	2.26
(3) 10 - 50 billion yen	237	234	1	0.43	0	4.27	3.85
(4) 50 - 100 billion yen	45	45	1	2.22	6	13.33	0
(5) > 100 billion yen	34	34	0	0.00	1	2.94	0.00

A: Corporations that responded

B: Frequency (total value)

C: Traffic, transport

D: Communications

E: Cities, construction

F: Humanities, social sciences

G: Other

Sources of Personnel

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	828	604	22	27	102	73
Frequency (total value) / distribution ratio	837	828.00	604	72.95	2.66	12.32	8.82
(1) Agriculture, forestry, fisheries	7	7	6	0	0	1	0
(2) Mining	4	3	3	0	0	0	0
(3) Construction	87	85	59	7	8.24	10	6
(4) Food products	55	55	27	2	3.64	20	5
(5) Textiles	21	21	18	1	4.76	2	0
(6) Pulp and paper	15	15	10	0	0	5	0
(7) Publishing and printing	6	6	5	0	0	0	1
(8) General chemicals	63	62	39	2	3.23	8	10
(9) Oils and paints	13	13	10	0	0	3	0
(10) Pharmaceuticals	37	37	28	0	0	3	0
(11) Other chemicals	41	41	31	2	4.88	5	5
(12) Petroleum & coal products	20	20	14	1	5.00	3	2
(13) Plastic products	15	15	10	0	0	4	1
(14) Rubber products	8	8	5	1	12.50	2	0
(15) Ceramics	27	26	20	0	0	2	0
(16) Steel manufacturing	43	42	31	0	0	4	2
(17) Nonferrous metals	31	31	19	0	0	3	5
(18) Metal products	32	32	22	0	0	5	9
(19) Machinery	64	63	52	2	3.17	7	5
(20) Electrical machinery & appliances	78	77	62	1	1.30	3	1
(21) Communications/electronic/electric instrumentation	37	37	32	1	0	1	4
(22) Automobiles	45	45	38	1	2.22	2	3
(23) Other machinery for transport	21	21	18	1	4.76	0	2
(24) Precision machinery	19	18	12	0	0	2	2
(25) Other mfg. industries	12	12	9	0	8.33	1	1
(26) Transportation, communications & public utilities	25	25	16	0	0	4	3
(27) Other kinds of industries	11	11	8	0	0	0	2

Sources of Personnel

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	828	604	22	27	102	73
Frequency (total value) / distribution ratio	837	828.00	604	72.95	2.66	12.32	8.82
(1) 1 - 5 billion yen	344	340	241	5	1.47	60	27
(2) 5 - 10 billion yen	177	177	136	7	3.95	21	11
(3) 10 - 50 billion yen	237	233	171	8	3.43	18	26
(4) 50 - 100 billion yen	45	44	30	1	2.27	3	6
(5) > 100 billion yen	34	34	26	1	2.94	0	3

A: Corporations that responded
 B: Frequency (total value)
 C: Male researchers
 D: Female researchers
 E: Foreign researchers
 F: Do not consider sources other than new graduates
 G: Other

Question 13. Development and Assessment of New Products

By type of industry	A	B	C	D
Corporations that responded	837	831	91	740
Frequency (total value) / distribution ratio	837	831.00	91	10.95
(1) Agriculture, forestry, fisheries	7	7	1	14.29
(2) Mining	4	3	0	0.00
(3) Construction	87	86	7	8.14
(4) Food products	55	55	9	16.36
(5) Textiles	21	21	2	9.52
(6) Pulp and paper	15	15	0	0.00
(7) Publishing and printing	6	6	1	16.67
(8) General chemicals	63	63	8	12.70
(9) Oils and paints	13	13	0	0.00
(10) Pharmaceuticals	37	37	11	29.73
(11) Other chemicals	41	41	5	12.20
(12) Petroleum & coal products	20	19	3	15.79
(13) Plastic products	15	15	1	6.67
(14) Rubber products	8	8	1	12.50
(15) Ceramics	27	27	3	11.11
(16) Steel manufacturing	43	43	2	4.65
(17) Nonferrous metals	31	30	3	10.00
(18) Metal products	32	32	2	6.25
(19) Machinery	64	63	8	12.70
(20) Electrical machinery & appliances	78	78	9	11.54
(21) Communications/electronic/instrumentation	37	37	3	8.11
(22) Automobiles	45	45	4	8.89
(23) Other machinery for transport	21	21	2	9.52
(24) Precision machinery	19	19	2	10.53
(25) Other aip. industries	12	12	0	0.00
(26) Transportation, communications & public utilities	25	25	2	8.00
(27) Other kinds of industries	11	10	2	20.00

Development and Assessment of New Products

By scale of capitalization	A	B	C	D
Corporations that responded	837	831	91	740
Frequency (total value) / distribution ratio	837	831.00	91	10.95
(1) 1 - 5 billion yen	344	342	29	8.48
(2) 5 - 10 billion yen	177	176	12	6.82
(3) 10 - 50 billion yen	237	235	33	14.04
(4) 50 - 100 billion yen	45	45	11	24.44
(5) > 100 billion yen	34	33	6	18.18

- A: Corporations that responded
 B: Frequency (total value)
 C: Have special posts (organizations) that research the social impact of a new product
 D: Do not have special posts (organizations) that research the social impact of a new product

Bioethical Considerations

By type of industry	A	B	C	D	E	F	6
Corporations that responded frequency (total value) / distribution ratio	837 837	251 251.00	45 45	10 10	55 55	138 138	3 3
(1) Agriculture, forestry, fisheries	7	2	1	0	0	1	0
(2) Mining	4	1	0	0	0	1	0
(3) Construction	87	23	1	4.35	0	17.39	0
(4) Food products	55	25	5	20.00	4	78.26	0
(5) Textiles	21	6	1	16.67	7	44.00	0
(6) Pulp and paper	15	4	1	25.00	3	33.33	0
(7) Publishing and printing	6	3	0	0.00	2	50.00	0
(8) General chemicals	63	23	7	30.43	2	33.33	0
(9) Dyes and paints	13	8	0	0.00	7	30.43	0
(10) Pharmaceuticals	37	33	21	63.64	1	75.00	0
(11) Other chemicals	41	11	2	18.18	7	6.06	1
(12) Petroleum & coal products	20	3	0	0.00	2	63.64	0
(13) Plastic products	15	2	0	0.00	2	33.33	0
(14) Rubber products	8	3	0	0.00	1	50.00	0
(15) Ceramics	27	6	1	16.67	2	66.67	0
(16) Steel manufacturing	43	16	2	12.50	2	50.00	0
(17) Nonferrous metals	31	5	0	0.00	2	50.00	0
(18) Metal products	32	7	0	0.00	1	80.00	0
(19) Machinery	64	18	0	0.00	1	85.71	0
(20) Electrical machinery & appliances	78	14	1	7.14	1	83.33	0
(21) Communications/electronic/instrumentation	37	13	0	0.00	0	92.86	0
(22) Automobiles	45	4	0	0.00	3	69.23	0
(23) Other machinery for transport	21	5	0	0.00	1	75.00	0
(24) Precision machinery	19	5	1	20.00	0	100.00	0
(25) Other a/c. industries	12	4	0	0.00	3	20.00	0
(26) Transportation, communications & public utilities	25	3	1	33.33	2	50.00	0
(27) Other kinds of industries	11	4	0	0.00	0	33.33	1
						75.00	0

Bioethical Considerations

By scale of capitalization	A	B	C	D	E	F	6
Corporations that responded frequency (total value) / distribution ratio	837 837	251 251.00	45 45	10 10	55 55	138 138	3 3
(1) 1 - 5 billion yen	344	93	12	12.90	4	17.20	2
(2) 5 - 10 billion yen	177	56	5	8.93	1	21.43	1
(3) 10 - 50 billion yen	237	71	19	26.76	3	28.17	0
(4) 50 - 100 billion yen	45	18	4	22.22	2	16.67	0
(5) > 100 billion yen	34	13	5	38.46	0	30.77	0

A: Corporations that responded
B: Frequency (total value)
C: Bioethics taken deeply into consideration
D: Sometimes taken into consideration
E: Not taken into consideration now but will be in the future
F: Bioethics does not pertain to the type of industry, so such problems will not occur
6: Other

The Impact of Computers

By type of industry	A	B	C	D	E	F	G
Corporations that responded Frequency (total value) / distribution ratio	837 837	134 134.00	53 53	25 25	18.66	5.22	26.12
(1) Agriculture, forestry, fisheries	7	0	0	0	0.00	0.00	0.00
(2) Mining	4	1	0	0	0.00	1	0.00
(3) Construction	87	16	5	4	25.00	4	0.00
(4) Food products	55	3	1	33.33	0.00	0.00	33.33
(5) Textiles	21	2	0	0	0.00	1	0.00
(6) Pulp and paper	15	3	0	0	0.00	3	0.00
(7) Publishing and printing	6	2	2	100.00	0.00	0.00	0.00
(8) General chemicals	63	5	5	100.00	0.00	0.00	0.00
(9) Oils and paints	13	3	1	33.33	1	33.33	0.00
(10) Pharmaceuticals	37	1	0	0	0.00	1	0.00
(11) Other chemicals	41	4	1	25.00	0.00	25.00	0.00
(12) Petroleum & coal products	20	0	0	0.00	0.00	0.00	0.00
(13) Plastic products	15	1	1	100.00	0.00	0.00	0.00
(14) Rubber products	8	3	1	33.33	0.00	0.00	0.00
(15) Ceramics	27	1	0	0.00	100.00	0.00	0.00
(16) Steel manufacturing	43	7	0	0.00	28.57	0	0.00
(17) Nonferrous metals	31	2	1	50.00	0.00	1	0.00
(18) Metal products	32	5	1	20.00	20.00	2	0.00
(19) Machinery	64	13	5	38.46	7.69	5	0.00
(20) Electrical machinery & appliances	78	24	10	41.67	8.33	10	0.00
(21) Communications/electronic/electric instrumentation	37	17	8	47.06	41.18	2	0.00
(22) Automobiles	45	2	1	50.00	0.00	1	0.00
(23) Other machinery for transport	21	4	3	75.00	25.00	0	0.00
(24) Precision machinery	19	6	1	16.67	66.67	0	0.00
(25) Other mfg. industries	12	3	2	66.67	33.33	0	0.00
(26) Transportation, communications & public utilities	25	3	2	66.67	0.00	33.33	0.00
(27) Other kinds of industries	11	3	2	66.67	0.00	33.33	0.00

The Impact of Computers

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded Frequency (total value) / distribution ratio	837 837	134 134.00	53 53	25 25	18.66	5.22	26.12
(1) 1 - 5 billion yen	344	49	17	34.69	8	4.08	22.45
(2) 5 - 10 billion yen	177	35	12	34.29	6	8.57	34.29
(3) 10 - 50 billion yen	237	34	14	41.18	3	2.94	29.41
(4) 50 - 100 billion yen	45	9	6	66.67	1	11.11	22.22
(5) > 100 billion yen	34	7	4	57.14	0	0.00	0.00

A: Corporations that responded
 B: Frequency (total value)
 C: A great impact, so we evaluate the effects of computers while we conduct our development
 D: A great impact, but cannot say the effects are negative
 E: Not much impact at present stage
 F: Impact is more positive than negative
 G: Impact is little enough that it can be ignored, so we do not evaluate it

The Impact of Computers

By type of industry	A	B	C
Corporations that responded	837	134	9
Frequency (total value) / distribution ratio	837	134.00	9
(1) Agriculture, forestry, fisheries	7	0	0
(2) Mining	4	1	0
(3) Construction	87	16	1
(4) Food products	55	3	1
(5) Textiles	21	2	0
(6) Pulp and paper	15	3	0
(7) Publishing and printing	6	2	0
(8) General chemicals	63	5	0
(9) Oils and paints	13	3	0
(10) Pharmaceuticals	37	1	0
(11) Other chemicals	41	4	1
(12) Petroleum & coal products	20	0	0
(13) Plastic products	15	1	0
(14) Rubber products	8	3	1
(15) Ceramics	27	1	0
(16) Steel manufacturing	43	7	3
(17) Nonferrous metals	31	2	0
(18) Metal products	32	5	0
(19) Machinery	64	13	1
(20) Electrical machinery & appliances	78	24	1
(21) Communications/electronic/electric instrumentation	17	1	0
(22) Automobiles	45	2	0
(23) Other machinery for transport	21	4	0
(24) Precision machinery	19	6	0
(25) Other a/g. industries	12	3	0
(26) Transportation, communications & public utilities	25	3	0
(27) Other kinds of industries	11	3	0

The Impact of Computers

By scale of capitalization	A	B	C
Corporations that responded	837	134	9
Frequency (total value) / distribution ratio	837	134.00	9
(1) 1 - 5 billion yen	344	49	7
(2) 5 - 10 billion yen	177	35	1
(3) 10 - 50 billion yen	237	34	1
(4) 50 - 100 billion yen	45	9	0
(5) > 100 billion yen	34	7	0

A: Corporations that responded
B: Frequency (total value)
C: Other

Question 14. Comparison: Well-being equipment to assist elderly

By type of industry	A	B	C	D	E
Corporations that responded	837	75	3	20	52
Frequency (total value) / distribution ratio	837	75.00	3	4.00	26.67
(1) Agriculture, forestry, fisheries	7	1	0	0	0
(2) Mining	4	1	0	0	0
(3) Construction	87	8	0	2	0
(4) Food products	55	2	0	0	0
(5) Textiles	21	1	0	1	0
(6) Pulp and paper	15	0	0	0	0
(7) Publishing and printing	6	1	0	0	0
(8) General chemicals	63	5	0	1	0
(9) Oils and paints	13	1	0	0	0
(10) Pharmaceuticals	37	2	0	1	0
(11) Other chemicals	41	1	0	0	0
(12) Petroleum & coal products	20	1	0	1	0
(13) Plastic products	15	1	1	0	0
(14) Rubber products	8	0	0	0	0
(15) Ceramics	27	1	0	0	0
(16) Steel manufacturing	43	1	0	1	0
(17) Nonferrous metals	31	4	0	0	0
(18) Metal products	32	0	0	0	0
(19) Machinery	64	3	1	33.33	1
(20) Electrical machinery & appliances	78	9	0	0	0
(21) Communications/electronic/electric instrumentation	37	9	0	0	0
(22) Automobiles	45	6	0	1	0
(23) Other machinery for transport	21	6	0	3	0
(24) Precision machinery	19	6	0	3	0
(25) Other eq. industries	12	1	0	0	0
(26) Transportation, communications & public utilities	25	2	1	50.00	1
(27) Other kinds of industries	11	2	0	0	0

Comparison: Well-being equipment to assist elderly

By scale of capitalization	A	B	C	D	E
Corporations that responded	837	75	3	20	52
Frequency (total value) / distribution ratio	837	75.00	3	4.00	26.67
(1) 1 - 5 billion yen	344	27	1	3.70	22.22
(2) 5 - 10 billion yen	177	11	0	0.00	36.36
(3) 10 - 50 billion yen	237	24	1	4.17	29.17
(4) 50 - 100 billion yen	45	7	0	0.00	28.57
(5) > 100 billion yen	34	6	1	16.67	16.67

A: Corporations that responded

B: Frequency (total value)

C: Ahead of the U.S. and Europe

D: Same as the U.S. and Europe

E: Behind the U.S. and Europe

Comparison: Methods for designing comfortable living spaces

By type of industry	A	B	C	D	E
Corporations that responded	837	150	16	86	48
Frequency (total value) / distribution ratio	837	150.00	16	10.67	57.33
(1) Agriculture, forestry, fisheries	7	2	1	50.00	1
(2) Mining	4	0	0	0.00	0
(3) Construction	87	50	6	12.00	34
(4) Food products	55	2	0	0.00	0
(5) Textiles	21	4	0	0.00	2
(6) Pulp and paper	15	0	0	0.00	2
(7) Publishing and printing	6	3	0	0.00	0
(8) General chemicals	63	10	1	33.33	2
(9) Oils and paints	13	2	1	50.00	6
(10) Pharmaceuticals	37	2	0	0.00	0
(11) Other chemicals	41	4	1	25.00	1
(12) Petroleum & coal products	20	0	0	0.00	0
(13) Plastic products	15	2	1	50.00	1
(14) Rubber products	8	0	0	0.00	0
(15) Ceramics	27	8	0	0.00	8
(16) Steel manufacturing	43	2	0	0.00	1
(17) Nonferrous metals	31	5	1	20.00	1
(18) Metal products	32	7	0	0.00	5
(19) Machinery	64	5	2	40.00	2
(20) Electrical machinery & appliances	78	14	0	0.00	7
(21) Communications/electronic/electric instrumentation	37	8	1	12.50	1
(22) Automobiles	45	5	1	20.00	3
(23) Other machinery for transport	21	0	0	0.00	0
(24) Precision machinery	19	4	0	0.00	3
(25) Other equip. industries	12	6	0	0.00	1
(26) Transportation, communications & public utilities	25	4	0	0.00	1
(27) Other kinds of industries	11	1	0	0.00	1

Comparison: Methods for designing comfortable living spaces

By scale of capitalization	A	B	C	D	E
Corporations that responded	837	150	16	86	48
Frequency (total value) / distribution ratio	837	150.00	16	10.67	57.33
(1) 1 - 5 billion yen	344	46	4	8.70	25
(2) 5 - 10 billion yen	177	33	1	3.03	23
(3) 10 - 50 billion yen	237	48	8	16.67	26
(4) 50 - 100 billion yen	45	13	1	7.69	8
(5) > 100 billion yen	34	10	2	20.00	4

A: Corporations that responded
 B: Frequency (total value)
 C: Ahead of the U.S. and Europe
 D: Same as the U.S. and Europe
 E: Behind the U.S. and Europe

Comparison: Household electrical products

By type of industry	A	B	C	D	E
Corporations that responded	837	96	58	30	8
Frequency (total value) / distribution ratio	837	96.00	58	60.42	31.25
(1) Agriculture, forestry, fisheries	7	1	1	100.00	0
(2) Mining	4	0	0	0.00	0
(3) Construction	87	6	2	33.33	3
(4) Food products	55	2	0	0.00	0
(5) Textiles	21	0	0	0.00	0
(6) Pulp and paper	15	0	0	0.00	0
(7) Publishing and printing	6	1	0	0.00	0
(8) General chemicals	63	7	4	57.14	2
(9) Oils and paints	13	0	0	0.00	0
(10) Pharmaceuticals	37	2	2	100.00	0
(11) Other chemicals	41	4	1	25.00	3
(12) Petroleum & coal products	20	0	0	0.00	0
(13) Plastic products	15	1	0	0.00	0
(14) Rubber products	8	0	0	0.00	0
(15) Ceramics	27	0	0	0.00	0
(16) Steel manufacturing	43	3	3	100.00	0
(17) Nonferrous metals	31	3	3	100.00	0
(18) Metal products	32	3	2	66.67	1
(19) Machinery	64	5	1	20.00	4
(20) Electrical machinery & appliances	78	29	23	79.31	6
(21) Communications/electronic/electric instrumentation	37	14	10	71.43	4
(22) Automobiles	45	3	1	33.33	1
(23) Other machinery for transport	21	2	0	0.00	2
(24) Precision machinery	19	4	3	75.00	0
(25) Other mfg. industries	12	1	0	0.00	1
(26) Transportation, communications & public utilities	25	3	2	66.67	1
(27) Other kinds of industries	11	2	0	0.00	2

Comparison: Household electrical products

By scale of capitalization	A	B	C	D	E
Corporations that responded	837	96	58	30	8
Frequency (total value) / distribution ratio	837	96.00	58	60.42	31.25
(1) 1 - 5 billion yen	344	35	18	51.43	14
(2) 5 - 10 billion yen	177	21	15	71.43	6
(3) 10 - 50 billion yen	237	30	18	60.00	7
(4) 50 - 100 billion yen	45	2	1	50.00	1
(5) > 100 billion yen	34	8	6	75.00	2

A: Corporations that responded

B: Frequency (total value)

C: Ahead of the U.S. and Europe

D: Same as the U.S. and Europe

E: Behind the U.S. and Europe

Comparison: Information and communications equipment

By type of industry	A	B	C	D	E
Corporations that responded	837	143	54	70	19
Frequency (total value) / distribution ratio	837	143.00	54	37.76	70
(1) Agriculture, forestry, fisheries	7	1	1	100.00	0
(2) Mining	4	1	0	0.00	0
(3) Construction	87	14	4	28.57	8
(4) Food products	55	2	0	0.00	1
(5) Textiles	21	1	0	0.00	0
(6) Pulp and paper	15	0	0	0.00	0
(7) Publishing and printing	6	2	1	50.00	0
(8) General chemicals	63	6	2	33.33	3
(9) Oils and paints	13	0	0	0.00	0
(10) Pharmaceuticals	37	2	1	50.00	0
(11) Other chemicals	41	5	3	60.00	1
(12) Petroleum & coal products	20	1	0	0.00	0
(13) Plastic products	15	2	1	50.00	0
(14) Rubber products	8	0	0	0.00	0
(15) Ceramics	27	1	0	0.00	0
(16) Steel manufacturing	43	3	1	33.33	0
(17) Nonferrous metals	31	9	5	55.56	4
(18) Metal products	32	0	0	0.00	0
(19) Machinery	64	4	1	25.00	3
(20) Electrical machinery & appliances	78	41	16	39.02	21
(21) Communications/electronic/instrumentation	37	26	11	42.31	13
(22) Automobiles	45	5	0	0.00	4
(23) Other machinery for transport	21	1	1	100.00	0
(24) Precision machinery	19	8	4	50.00	4
(25) Other mfg. industries	12	1	0	0.00	1
(26) Transportation, communications & public utilities	25	5	2	40.00	3
(27) Other kinds of industries	11	2	0	0.00	2

Comparison: Information and communications equipment

By scale of capitalization	A	B	C	D	E
Corporations that responded	837	143	54	70	19
Frequency (total value) / distribution ratio	837	143.00	54	37.76	70
(1) 1 - 5 billion yen	344	45	16	35.56	23
(2) 5 - 10 billion yen	177	33	12	36.36	20
(3) 10 - 50 billion yen	237	43	19	44.19	18
(4) 50 - 100 billion yen	45	8	1	12.50	4
(5) > 100 billion yen	34	14	6	42.86	5

A: Corporations that responded

B: Frequency (total value)

C: Ahead of the U.S. and Europe

D: Same as the U.S. and Europe

E: Behind the U.S. and Europe

Comparison: Public works and construction technology that takes disaster prevention and views into consideration

By type of industry	A	B	C	D	E
Corporations that responded	837	147	33	71	43
Frequency (total value) / distribution ratio	837	147.00	33	22.45	43
(1) Agriculture, forestry, fisheries	7	2	0	0.00	0
(2) Mining	4	0	0	0.00	0
(3) Construction	87	65	20	30.77	19
(4) Food products	55	2	0	0.00	2
(5) Textiles	21	0	0	0.00	0
(6) Pulp and paper	15	0	0	0.00	0
(7) Publishing and printing	6	1	0	0.00	1
(8) General chemicals	63	8	1	12.50	3
(9) Oils and paints	13	1	0	0.00	1
(10) Pharmaceuticals	37	2	0	0.00	0
(11) Other chemicals	41	2	0	0.00	1
(12) Petroleum & coal products	20	0	0	0.00	0
(13) Plastic products	15	2	0	0.00	0
(14) Rubber products	8	0	0	0.00	0
(15) Ceramics	27	5	0	0.00	0
(16) Steel manufacturing	43	6	1	16.67	1
(17) Nonferrous metals	31	4	1	25.00	0
(18) Metal products	32	10	2	20.00	3
(19) Machinery	64	5	1	20.00	1
(20) Electrical machinery & appliances	78	10	2	20.00	5
(21) Communications/electronic/electric instrumentation	37	5	1	20.00	2
(22) Automobiles	45	2	0	0.00	1
(23) Other machinery for transport	21	3	2	66.67	0
(24) Precision machinery	19	3	0	0.00	1
(25) Other eng. industries	12	0	0	0.00	0
(26) Transportation, communications & public utilities	25	7	2	28.57	2
(27) Other kinds of industries	11	2	0	0.00	0

Comparison: Public works and construction technology that takes disaster prevention and views into consideration

By scale of capitalization	A	B	C	D	E
Corporations that responded	837	147	33	71	43
Frequency (total value) / distribution ratio	837	147.00	33	22.45	43
(1) 1 - 5 billion yen	344	55	8	14.55	18
(2) 5 - 10 billion yen	177	28	7	25.00	5
(3) 10 - 50 billion yen	237	45	12	26.67	15
(4) 50 - 100 billion yen	45	10	4	40.00	1
(5) > 100 billion yen	34	9	2	22.22	4

A: Corporations that responded

B: Frequency (total value)

C: Ahead of the U.S. and Europe

D: Same as the U.S. and Europe

E: Behind the U.S. and Europe

Comparison: Traffic and transportation control systems

By type of industry	A	B	C	D	E
Corporations that responded	837	127	35	68	24
Frequency (total value) / distribution ratio	837	127.00	35	27.56	53.54
(1) Agriculture, forestry, fisheries	7	1	0	1	0
(2) Mining	4	1	0	0	0
(3) Construction	87	16	6	4	1
(4) Food products	55	2	0	1	6
(5) Textiles	21	0	0	0	1
(6) Pulp and paper	15	0	0	0	0
(7) Publishing and printing	6	1	0	0	0
(8) General chemicals	63	6	2	2	1
(9) Oils and paints	13	1	0	33.33	33.33
(10) Pharmaceuticals	37	3	0	0	0
(11) Other chemicals	41	1	0	100.00	100.00
(12) Petroleum & coal products	20	0	0	0	0
(13) Plastic products	15	1	0	1	0
(14) Rubber products	8	3	0	100.00	0
(15) Ceramics	27	0	0	3	0
(16) Steel manufacturing	43	4	0	75.00	0
(17) Nonferrous metals	31	5	4	20.00	1
(18) Metal products	32	3	1	66.67	0
(19) Machinery	64	10	2	70.00	0
(20) Electrical machinery & appliances	78	18	8	33.33	1
(21) Communications/electronic instrumentation	37	9	2	44.44	4
(22) Automobiles	45	17	4	55.56	2
(23) Other machinery for transport	21	11	2	70.59	1
(24) Precision machinery	19	3	1	72.73	1
(25) Other eng. industries	12	0	0	33.33	1
(26) Transportation, communications & public utilities	25	9	2	66.67	0
(27) Other kinds of industries	11	2	1	50.00	1

Comparison: Traffic and transportation control systems

By scale of capitalization	A	B	C	D	E
Corporations that responded	837	127	35	68	24
Frequency (total value) / distribution ratio	837	127.00	35	27.56	53.54
(1) 1 - 5 billion yen	344	42	10	21	11
(2) 5 - 10 billion yen	177	26	10	38.46	26.19
(3) 10 - 50 billion yen	237	37	7	14	7
(4) 50 - 100 billion yen	45	13	4	23	18.92
(5) > 100 billion yen	34	9	4	6	23.08
				4	11.11

- A: Corporations that responded
- B: Frequency (total value)
- C: Ahead of the U.S. and Europe
- D: Same as the U.S. and Europe
- E: Behind the U.S. and Europe

Comparison: Technology for preventing environmental pollution

By type of industry	A	B	C	D	E
Corporations that responded	837	194	81	92	21
Frequency (total value) / distribution ratio	837	194.00	81	41.75	47.42
(1) Agriculture, forestry, fisheries	7	2	0	0.00	1
(2) Mining	4	2	0	0.00	2
(3) Construction	87	28	6	21.43	14
(4) Food products	55	4	2	50.00	1
(5) Textiles	21	4	2	50.00	2
(6) Pulp and paper	15	3	2	66.67	1
(7) Publishing and printing	6	1	0	0.00	1
(8) General chemicals	63	23	14	60.87	8
(9) Oils and paints	13	3	3	100.00	0
(10) Pharmaceuticals	37	4	1	25.00	2
(11) Other chemicals	41	12	3	25.00	8
(12) Petroleum & coal products	20	8	2	25.00	5
(13) Plastic products	15	3	1	33.33	1
(14) Rubber products	8	1	1	100.00	0
(15) Ceramics	27	5	2	40.00	2
(16) Steel manufacturing	43	11	7	63.64	4
(17) Nonferrous metals	31	9	5	55.56	4
(18) Metal products	32	3	1	33.33	2
(19) Machinery	64	15	5	33.33	9
(20) Electrical machinery & appliances	78	11	4	36.36	5
(21) Communications/electronic/electric instrumentation	37	10	5	50.00	5
(22) Automobiles	45	10	5	50.00	4
(23) Other machinery for transport	21	5	3	60.00	1
(24) Precision machinery	19	3	0	0.00	3
(25) Other a/c. industries	12	4	1	25.00	3
(26) Transportation, communications & public utilities	25	9	6	66.67	3
(27) Other kinds of industries	11	1	0	0.00	1

Comparison: Technology for preventing environmental pollution

By scale of capitalization	A	B	C	D	E
Corporations that responded	837	194	81	92	21
Frequency (total value) / distribution ratio	837	194.00	81	41.75	47.42
(1) 1 - 5 billion yen	344	60	19	31.67	32
(2) 5 - 10 billion yen	177	39	18	46.15	16
(3) 10 - 50 billion yen	237	64	28	43.75	30
(4) 50 - 100 billion yen	45	15	7	46.67	7
(5) > 100 billion yen	34	16	9	56.25	7

A: Corporations that responded
 B: Frequency (total value)
 C: Ahead of the U.S. and Europe
 D: Same as the U.S. and Europe
 E: Behind the U.S. and Europe

Comparison: Medical treatment equipment

By type of industry					
Corporations that responded					
Frequency (total value) / distribution ratio	A	B	C	D	E
(1) Agriculture, forestry, fisheries	837	91	15	16.48	18
(2) Mining	837	91.00	15	58	18
(3) Construction	7	1	0	1	0
(4) Food products	4	0	0	0	0
(5) Textiles	87	5	3	0	0
(6) Pulp and paper	55	3	0	1	1
(7) Publishing and printing	21	2	0	2	1
(8) General chemicals	15	0	0	1	1
(9) Oils and paints	6	2	0	0	0
(10) Pharmaceuticals	63	8	2	2	0
(11) Other chemicals	13	2	1	4	2
(12) Petroleum & coal products	37	11	0	1	0
(13) Plastic products	41	4	1	8	3
(14) Rubber products	20	2	0	1	2
(15) Ceramics	15	2	0	0	2
(16) Steel manufacturing	8	0	0	2	0
(17) Nonferrous metals	27	0	0	0	0
(18) Metal products	43	5	0	0	0
(19) Machinery	31	5	1	4	1
(20) Electrical machinery & appliances	32	0	0	80.00	0
(21) Communications/electronic/electric instrumentation	64	5	0	0	0
(22) Automobiles	78	10	1	80.00	0
(23) Other machinery for transport	10	3	30.00	4	0
(24) Precision machinery	37	8	1	40.00	3
(25) Other e/g. industries	45	3	0	75.00	1
(26) Transportation, communications & public utilities	21	2	0	66.67	1
(27) Other kinds of industries	19	8	2	100.00	0
	12	0	0	75.00	0
	25	1	0	0.00	0
	11	2	0	100.00	0
				100.00	0

Comparison: Medical treatment equipment

By scale of capitalization					
Corporations that responded					
Frequency (total value) / distribution ratio	A	B	C	D	E
(1) 1 - 5 billion yen	837	91	15	16.48	18
(2) 5 - 10 billion yen	837	91.00	15	58	18
(3) 10 - 50 billion yen	344	29	4	18	7
(4) 50 - 100 billion yen	177	13	4	7	2
(5) > 100 billion yen	237	37	7	25	5
	45	3	0	2	1
	34	9	0	6	3
				66.67	33.33

A: Corporations that responded

B: Frequency (total value)

C: Ahead of the U.S. and Europe

D: Same as the U.S. and Europe

E: Behind the U.S. and Europe

Comparison: Evaluating the impact of the company's products on society

By type of industry	A	B	C	D	E
Corporations that responded	837	312	66	195	51
Frequency (total value) / distribution ratio	837	312.00	66	21.15	62.50
(1) Agriculture, forestry, fisheries	7	4	0	0.00	3
(2) Mining	4	2	0	0.00	2
(3) Construction	87	25	4	16.00	17
(4) Food products	55	18	4	22.22	12
(5) Textiles	21	10	3	30.00	7
(6) Pulp and paper	15	4	1	25.00	3
(7) Publishing and printing	6	3	1	33.33	2
(8) General chemicals	63	21	1	4.76	14
(9) Oils and paints	13	5	0	0.00	4
(10) Pharmaceuticals	37	17	1	5.88	10
(11) Other chemicals	41	19	3	15.79	12
(12) Petroleum & coal products	20	9	0	0.00	7
(13) Plastic products	15	8	2	25.00	6
(14) Rubber products	8	4	0	0.00	4
(15) Ceramics	27	5	4	80.00	1
(16) Steel manufacturing	43	13	7	53.85	5
(17) Nonferrous metals	31	14	2	14.29	11
(18) Metal products	32	10	1	10.00	9
(19) Machinery	64	22	11	50.00	11
(20) Electrical machinery & appliances	78	32	6	18.75	16
(21) Communications/electronic/instrumentation	37	14	3	21.43	8
(22) Automobiles	45	14	4	28.57	7
(23) Other machinery for transport	21	9	0	0.00	7
(24) Precision machinery	19	13	5	46.15	6
(25) Other efg. industries	12	5	1	20.00	3
(26) Transportation, communications & public utilities	25	8	0	0.00	6
(27) Other kinds of industries	11	4	1	25.00	2

Comparison: Evaluating the impact of the company's products on society

By scale of capitalization	A	B	C	D	E
Corporations that responded	837	312	66	195	51
Frequency (total value) / distribution ratio	837	312.00	66	21.15	62.50
(1) 1 - 5 billion yen	344	121	25	20.66	76
(2) 5 - 10 billion yen	177	67	15	22.39	42
(3) 10 - 50 billion yen	237	89	20	22.47	55
(4) 50 - 100 billion yen	45	19	2	10.53	14
(5) > 100 billion yen	34	16	4	25.00	8

A: Corporations that responded
 B: Frequency (total value)
 C: Ahead of the U.S. and Europe
 D: Same as the U.S. and Europe
 E: Behind the U.S. and Europe

III. State of Technology Trade

Question 1.

By type of industry

	A	B	C	D
(1) Agriculture, forestry, fisheries	10,751,465	10,128,880	536,129	1,294
(2) Mining	700	1,400	0	0
(3) Construction	1,120	17,829	0	0
(4) Food products	206,592	45,642	4,837	110
(5) Textiles	597,926	232,343	2	1
(6) Pulp and paper	137,524	42,332	0	0
(7) Publishing and printing	29,400	4,575	0	0
(8) General chemicals	183,531	28,160	775	4
(9) Oils and paints	1,116,164	455,818	9,600	100
(10) Pharmaceuticals	200,897	198,292	0	0
(11) Other chemicals	991,639	628,637	190,952	110
(12) Petroleum & coal products	323,000	675,613	20,840	29
(13) Plastic products	125,369	597,092	16,119	143
(14) Rubber products	46,161	21,187	4,200	60
(15) Ceramics	144,291	206,911	470	10
(16) Steel manufacturing	112,882	113,771	346	2
(17) Nonferrous metals	1,264,705	174,617	10,276	110
(18) Metal products	165,320	274,137	13,362	11
(19) Machinery	42,597	79,634	1,200	20
(20) Electrical machinery & appliances	188,007	357,031	7,961	19
(21) Communications/electronic/electric instrumentation	1,558,376	2,021,000	176,966	163
(22) Automobiles	1,829,294	1,180,214	14,271	107
(23) Other machinery for transport	628,508	209,467	9,791	6
(24) Precision machinery	90,172	1,838,742	630	100
(25) Other eng. industries	9,619	505,772	36,552	60
(26) Transportation, communications & public utilities	8,567	143,391	12,460	10
(27) Other kinds of industries	3,179	5,054	2,720	100
		70,219	1,759	19

By scale of capitalization

	A	B	C	D
(1) 1 - 5 billion yen	10,751,465	10,128,880	536,129	1,294
(2) 5 - 10 billion yen	453,236	1,615,580	85,639	539
(3) 10 - 50 billion yen	268,949	675,177	14,691	139
(4) 50 - 100 billion yen	3,780,559	4,403,153	411,066	490
(5) > 100 billion yen	3,060,586	1,908,320	21,238	22
	3,188,135	1,526,650	3,495	104

A: Technology trade - exports (amount received) (10,000 yen)

B: Technology trade - imports (amount paid out) (10,000 yen)

C: Technology trade - amount of cross-licensing (10,000 yen)

D: Estimated amount of cross-licensing

(% of total technology exports and imports)

Question 2. State of Technology Trade - Entire Company

By type of industry	A	B	C	D	E
Corporations that responded	837	419	170	39	210
Frequency (total value) / distribution ratio	837	419.00	170	40.57	50.12
(1) Agriculture, forestry, fisheries	7	1	0	0	1
(2) Mining	4	4	0	0	4
(3) Construction	87	19	6	31.58	11
(4) Food products	35	21	6	28.57	11
(5) Textiles	21	11	5	45.45	3
(6) Pulp and paper	15	4	3	75.00	1
(7) Publishing and printing	6	4	3	75.00	1
(8) General chemicals	63	37	19	51.35	16
(9) Oils and paints	13	10	4	40.00	5
(10) Pharmaceuticals	37	22	5	22.73	15
(11) Other chemicals	41	20	10	50.00	9
(12) Petroleum & coal products	20	13	4	30.77	9
(13) Plastic products	15	10	5	50.00	4
(14) Rubber products	8	5	2	40.00	2
(15) Ceramics	27	11	4	36.36	7
(16) Steel manufacturing	43	19	13	68.42	5
(17) Nonferrous metals	31	17	9	52.94	5
(18) Metal products	32	15	5	33.33	8
(19) Machinery	64	35	13	37.14	21
(20) Electrical machinery & appliances	78	45	19	42.22	21
(21) Communications/electronic instrumentation	37	23	5	21.74	15
(22) Automobiles	45	31	20	64.52	8
(23) Other machinery for transport	21	14	4	28.57	9
(24) Precision machinery	19	12	3	25.00	8
(25) Other mfg. industries	12	6	1	16.67	5
(26) Transportation, communications & public utilities	25	5	1	20.00	2
(27) Other kinds of industries	11	5	1	20.00	4

State of Technology Trade - Entire Company

By scale of capitalization	A	B	C	D	E
Corporations that responded	837	419	170	39	210
Frequency (total value) / distribution ratio	837	419.00	170	40.57	50.12
(1) 1 - 5 billion yen	344	138	52	37.68	72
(2) 5 - 10 billion yen	177	77	32	41.56	40
(3) 10 - 50 billion yen	237	156	61	39.10	77
(4) 50 - 100 billion yen	45	28	16	57.14	11
(5) > 100 billion yen	34	20	9	45.00	10

A: Corporations that responded
 B: Frequency (total value)
 C: Excess of exports over imports
 D: Balance
 E: Excess of imports over exports

State of Technology Trade - Main Line of Business

By type of industry	A	B	C	D	E
Corporations that responded	837	331	151		
Frequency (total value) / distribution ratio	837	331.00	151	45.62	47 14.20 133 40.18
(1) Agriculture, forestry, fisheries	7	2	1	50.00	0 0.00 1 50.00
(2) Mining	4	2	0	0.00	0 0.00 2 100.00
(3) Construction	87	16	5	31.25	3 18.75 8 50.00
(4) Food products	55	16	5	31.25	3 18.75 8 50.00
(5) Textiles	21	10	4	40.00	3 30.00 3 30.00
(6) Pulp and paper	15	4	3	75.00	0 0.00 1 25.00
(7) Publishing and printing	6	3	2	66.67	0 0.00 1 33.33
(8) General chemicals	63	27	15	55.56	4 14.81 8 29.63
(9) Oils and paints	13	8	2	25.00	2 25.00 4 50.00
(10) Pharmaceuticals	37	20	4	20.00	2 10.00 14 70.00
(11) Other chemicals	41	17	9	52.94	1 5.88 7 41.18
(12) Petroleum & coal products	20	7	3	42.86	0 0.00 4 57.14
(13) Plastic products	15	7	4	57.14	1 14.29 2 28.57
(14) Rubber products	8	5	4	80.00	0 0.00 1 20.00
(15) Ceramics	27	11	6	54.55	2 18.18 3 27.27
(16) Steel manufacturing	43	14	9	64.29	1 7.14 4 28.57
(17) Nonferrous metals	31	13	11	84.62	2 15.38 0 0.00
(18) Metal products	32	14	6	42.86	3 21.43 5 35.71
(19) Machinery	64	28	13	46.43	1 3.57 14 50.00
(20) Electrical machinery & appliances	78	34	17	50.00	5 14.71 12 35.29
(21) Communications/electronic/electric instrumentation	37	18	4	22.22	4 22.22 10 55.56
(22) Automobiles	45	21	15	71.43	4 19.05 2 9.52
(23) Other machinery for transport	21	13	4	30.77	2 15.38 7 53.85
(24) Precision machinery	19	10	2	20.00	2 20.00 6 60.00
(25) Other eng. industries	12	3	1	33.33	0 0.00 2 66.67
(26) Transportation, communications & public utilities	25	5	1	20.00	2 40.00 2 40.00
(27) Other kinds of industries	11	3	1	33.33	0 0.00 2 66.67

State of Technology Trade - Main Line of Business

By scale of capitalization	A	B	C	D	E
Corporations that responded	837	331	151		
Frequency (total value) / distribution ratio	837	331.00	151	45.62	47 14.20 133 40.18
(1) 1 - 5 billion yen	344	109	48	44.04	17 15.60 44 40.37
(2) 5 - 10 billion yen	177	60	29	48.33	5 8.33 26 43.33
(3) 10 - 50 billion yen	237	122	52	42.62	23 18.85 47 38.52
(4) 50 - 100 billion yen	45	24	16	66.67	1 4.17 7 29.17
(5) > 100 billion yen	34	16	6	37.50	1 6.25 9 56.25

A: Corporations that responded
 B: Frequency (total value)
 C: Excess of exports over imports
 D: Balance
 E: Excess of imports over exports

State of Technology Trade - New Business

By type of industry	A	B	C	D	E
Corporations that responded	837	155	27	42	86
Frequency (total value) / distribution ratio	837	155.00	27	17.42	27.10
(1) Agriculture, forestry, fisheries	7	0	0	0	0
(2) Mining	4	2	0	0	0
(3) Construction	87	6	0	0	0
(4) Food products	55	10	1	10.00	33.33
(5) Textiles	21	6	1	16.67	40.00
(6) Pulp and paper	15	0	0	0.00	66.67
(7) Publishing and printing	6	2	0	0.00	1
(8) General chemicals	63	16	2	12.50	50.00
(9) Oils and paints	13	7	4	57.14	11
(10) Pharmaceuticals	37	7	1	14.29	68.75
(11) Other chemicals	41	13	2	18.75	2
(12) Petroleum & coal products	20	3	1	14.29	28.57
(13) Plastic products	15	3	0	33.33	4
(14) Rubber products	8	2	0	0.00	57.14
(15) Ceramics	27	6	0	0.00	61.54
(16) Steel manufacturing	43	7	2	28.57	66.67
(17) Nonferrous metals	31	9	2	22.22	100.00
(18) Metal products	32	4	0	0.00	83.33
(19) Machinery	64	7	0	0.00	57.14
(20) Electrical machinery & appliances	78	14	4	28.57	85.71
(21) Communications/electronic/electric instrumentation	37	9	2	22.22	35.71
(22) Automobiles	45	4	1	25.00	55.56
(23) Other machinery for transport	21	4	1	25.00	50.00
(24) Precision machinery	19	6	1	16.67	33.33
(25) Other aig. industries	12	2	1	50.00	50.00
(26) Transportation, communications & public utilities	25	4	1	25.00	25.00
(27) Other kinds of industries	11	2	0	0.00	100.00

State of Technology Trade - New Business

By scale of capitalization	A	B	C	D	E
Corporations that responded	837	155	27	42	86
Frequency (total value) / distribution ratio	837	155.00	27	17.42	27.10
(1) 1 - 5 billion yen	344	39	8	20.51	33.33
(2) 5 - 10 billion yen	177	23	4	17.39	46.15
(3) 10 - 50 billion yen	237	70	10	14.29	52.17
(4) 50 - 100 billion yen	45	12	3	25.00	39
(5) > 100 billion yen	34	11	2	18.18	75.00
				1	9.09
				0	8
				1	72.73

A: Corporations that responded

B: Frequency (total value)

C: Excess of exports over imports

D: Balance

E: Excess of imports over exports

Reasons for Excess of Imports Over Exports

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	207	109	31	31	18	0
Frequency (total value) / distribution ratio	837	282.00	109	52.66	24.15	24.15	24.64
(1) Agriculture, forestry, fisheries	7	1	0	0	0	1	0
(2) Mining	4	6	3	1	25.00	1	0
(3) Construction	87	14	5	2	20.00	3	0
(4) Food products	55	14	3	4	36.36	1	0
(5) Textiles	21	5	3	1	33.33	1	0
(6) Pulp and paper	15	1	0	0	0.00	0	0
(7) Publishing and printing	6	2	1	1	100.00	0	0
(8) General chemicals	63	24	11	4	25.00	5	0
(9) Oils and paints	13	6	1	0	0.00	2	0
(10) Pharmaceuticals	37	20	3	3	21.43	7	0
(11) Other chemicals	41	12	6	1	12.50	2	0
(12) Petroleum & coal products	20	13	9	2	22.22	0	0
(13) Plastic products	15	4	1	2	50.00	0	0
(14) Rubber products	8	3	1	1	50.00	0	0
(15) Ceramics	27	10	3	1	14.29	3	0
(16) Steel manufacturing	43	9	2	4	40.00	1	0
(17) Nonferrous metals	31	7	3	2	60.00	2	0
(18) Metal products	32	11	1	3	12.50	3	0
(19) Machinery	64	26	8	5	38.10	5	0
(20) Electrical machinery & appliances	78	20	16	3	14.29	6	0
(21) Communications/electronic/electric instrumentation	37	21	12	2	13.33	5	0
(22) Automobiles	45	9	5	0	62.50	1	0
(23) Other machinery for transport	21	10	5	1	11.11	0	0
(24) Precision machinery	19	12	4	3	55.56	2	0
(25) Other efg. industries	12	6	1	2	50.00	0	0
(26) Transportation, communications & public utilities	25	2	0	1	20.00	0	0
(27) Other kinds of industries	11	4	2	0	50.00	0	0

Reasons for Excess of Imports Over Exports

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	207	109	31	31	18	0
Frequency (total value) / distribution ratio	837	282.00	109	52.66	24.15	24.15	24.64
(1) 1 - 5 billion yen	344	95	33	12	17.14	25	0
(2) 5 - 10 billion yen	177	52	25	9	22.50	10	0
(3) 10 - 50 billion yen	237	107	41	20	53.25	14	0
(4) 50 - 100 billion yen	45	16	6	6	60.00	1	0
(5) > 100 billion yen	34	12	4	3	30.00	0	0

A: Corporations that responded

B: Frequency (total value)

C: Historically foreign countries have had the basic patents

D: Business restructuring

E: No room for basic research in our company

F: Due to tough competition from other domestic companies, we look overseas

G: Policy of basically not selling our technology to other companies

Reasons for Excess of Imports Over Exports

By type of industry	A	B	C	D	E
Corporations that responded	837	207	0	0	18
Frequency (total value) / distribution ratio	837	282.00	0	0.00	22 10.63
(1) Agriculture, forestry, fisheries	7	1	0	0.00	0 0.00
(2) Mining	4	6	0	0.00	0 0.00
(3) Construction	87	14	0	0.00	0 0.00
(4) Food products	55	14	0	0.00	0 0.00
(5) Textiles	21	5	0	0.00	0 36.36
(6) Pulp and paper	15	1	0	0.00	0 0.00
(7) Publishing and printing	6	2	0	0.00	1 100.00
(8) General chemicals	63	24	0	0.00	0 0.00
(9) Oils and paints	13	6	0	0.00	2 12.50
(10) Pharmaceuticals	37	20	0	0.00	1 20.00
(11) Other chemicals	41	12	0	0.00	1 7.14
(12) Petroleum & coal products	20	13	0	0.00	0 0.00
(13) Plastic products	15	4	0	0.00	1 11.11
(14) Rubber products	8	3	0	0.00	1 25.00
(15) Ceramics	27	10	0	0.00	0 0.00
(16) Steel manufacturing	43	9	0	0.00	0 0.00
(17) Nonferrous metals	31	7	0	0.00	0 0.00
(18) Metal products	32	11	0	0.00	0 0.00
(19) Machinery	64	26	0	0.00	1 4.76
(20) Electrical machinery & appliances	78	30	0	0.00	2 9.52
(21) Communications/electronic/electric instrumentation	37	21	0	0.00	0 0.00
(22) Automobiles	45	9	0	0.00	3 37.50
(23) Other machinery for transport	21	10	0	0.00	1 11.11
(24) Precision machinery	19	12	0	0.00	0 0.00
(25) Other a/c. industries	12	6	0	0.00	2 40.00
(26) Transportation, communications & public utilities	25	2	0	0.00	1 50.00
(27) Other kinds of industries	11	4	0	0.00	1 25.00

Reasons for Excess of Imports Over Exports

By scale of capitalization	A	B	C	D	E
Corporations that responded	837	207	0	0	18
Frequency (total value) / distribution ratio	837	282.00	0	0.00	22 10.63
(1) 1 - 5 billion yen	344	95	0	0.00	9 12.86
(2) 5 - 10 billion yen	177	52	0	0.00	0 0.00
(3) 10 - 50 billion yen	237	107	0	0.00	8 10.39
(4) 50 - 100 billion yen	45	16	0	0.00	1 10.00
(5) > 100 billion yen	34	12	0	0.00	4 40.00

A: Corporations that responded

B: Frequency (total value)

C: Price of overseas technology higher than Japan's

D: Recent appreciation of the Japanese yen

E: Other

Question 3. Exports - Number 1

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	345	93	243	4	1	4
Frequency (total value) / distribution ratio	837	345.00	93	243	4	1	4
(1) Agriculture, forestry, fisheries	7	2	0	2	0	0	0
(2) Mining	4	3	0	3	0	0	0
(3) Construction	87	15	4	11	0	0	0
(4) Food products	55	15	4	11	0	0	0
(5) Textiles	21	8	2	6	0	0	0
(6) Pulp and paper	15	3	2	1	0	0	0
(7) Publishing and printing	6	4	1	3	0	0	0
(8) General chemicals	63	31	14	17	0	0	0
(9) Dyes and pigments	13	8	0	8	0	0	0
(10) Pharmaceuticals	37	19	13	6	0	0	0
(11) Other chemicals	41	14	4	10	0	0	0
(12) Petroleum & coal products	20	7	3	3	0	0	0
(13) Plastic products	15	8	2	6	0	0	0
(14) Rubber products	8	6	1	5	0	0	0
(15) Ceramics	27	12	1	10	0	0	0
(16) Steel manufacturing	43	20	3	17	0	0	0
(17) Nonferrous metals	31	15	3	12	0	0	0
(18) Metal products	32	12	0	12	0	0	0
(19) Machinery	64	31	7	24	0	0	0
(20) Electrical machinery & appliances	78	35	12	24	0	0	0
(21) Communications/electronic/electric instrumentation	37	15	3	10	0	0	0
(22) Automobiles	45	31	4	27	0	0	0
(23) Other machinery for transport	21	13	1	12	0	0	0
(24) Precision machinery	19	9	6	3	0	0	0
(25) Other ship. industries	12	3	1	2	0	0	0
(26) Transportation, communications & public utilities	25	2	1	1	0	0	0
(27) Other kinds of industries	11	4	1	1	0	0	0

Exports - Number 1

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	345	93	243	4	1	4
Frequency (total value) / distribution ratio	837	345.00	93	243	4	1	4
(1) 1 - 5 billion yen	344	108	22	83	1	0.93	1
(2) 5 - 10 billion yen	177	60	10	48	2	3.33	0
(3) 10 - 50 billion yen	237	132	39	89	1	0.76	3
(4) 50 - 100 billion yen	45	29	16	13	0	0.00	0
(5) > 100 billion yen	34	16	6	10	0	0.00	0

A: Corporations that responded
B: Frequency (total value)
C: Patents
D: Know-how (technical guidance, etc.)

E: Designs, trademarks
F: Copyrights
G: Other

Exports - Number 2

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	226	132	74	19	0	1
Frequency (total value) / distribution ratio	837	226.00	132	74	19	0	1
(1) Agriculture, forestry, fisheries	7	1	1	0	0	0	0
(2) Mining	4	1	1	0	0	0	0
(3) Construction	87	8	5	2	0	0	0
(4) Food products	55	11	6	2	1	0	0
(5) Textiles	21	4	2	2	3	0	0
(6) Pulp and paper	15	2	0	2	0	0	0
(7) Publishing and printing	6	4	3	1	0	0	0
(8) General chemicals	63	24	11	13	0	0	0
(9) Oils and paints	13	6	4	0	0	0	0
(10) Pharmaceuticals	37	11	5	6	2	0	0
(11) Other chemicals	41	9	5	3	0	0	0
(12) Petroleum & coal products	20	3	1	2	1	0	0
(13) Plastic products	15	5	3	1	0	0	0
(14) Rubber products	8	4	2	1	0	0	0
(15) Ceramics	27	12	5	2	1	0	0
(16) Steel manufacturing	43	13	7	3	0	0	0
(17) Nonferrous metals	31	13	9	2	0	0	0
(18) Metal products	32	3	2	0	0	0	0
(19) Machinery	64	21	15	5	1	0	0
(20) Electrical machinery & appliances	78	26	10	12	4	0	0
(21) Communications/electronic/electric instrumentation	37	10	7	3	0	0	0
(22) Automobiles	45	19	15	4	0	0	0
(23) Other machinery for transport	21	10	8	2	0	0	0
(24) Precision machinery	19	5	2	3	0	0	0
(25) Other sfg. industries	12	2	1	1	0	0	0
(26) Transportation, communications & public utilities	25	2	1	1	0	0	0
(27) Other kinds of industries	11	2	1	1	0	0	0

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Exports - Number 2

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	226	132	74	19	0	1
Frequency (total value) / distribution ratio	837	226.00	132	74	19	0	1
(1) 1 - 5 billion yen	344	53	27	18	8	0	0
(2) 5 - 10 billion yen	177	36	26	7	3	0	0
(3) 10 - 50 billion yen	237	99	61	32	6	0	0
(4) 50 - 100 billion yen	45	23	9	13	1	0	0
(5) > 100 billion yen	34	15	9	4	1	0	1

A: Corporations that responded
 B: Frequency (total value)
 C: Patents
 D: Know-how (technical guidance, etc.)
 E: Designs, trademarks
 F: Copyrights
 G: Other

Exports - Number 3

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	84	9	6	59	8	2
Frequency (total value) / distribution ratio	837	84.00	9	10.71	7.14	70.24	2.38
(1) Agriculture, forestry, fisheries	7	0	0	0	0	0	0
(2) Mining	4	0	0	0	0	0	0
(3) Construction	87	6	1	0	0	0	0
(4) Food products	55	3	1	1	5	0	0
(5) Textiles	21	3	0	1	1	0	0
(6) Pulp and paper	15	0	0	0	3	0	0
(7) Publishing and printing	6	0	0	0	0	0	0
(8) General chemicals	63	8	0	0	2	0	0
(9) Oils and paints	13	1	0	0	7	12.50	0
(10) Pharmaceuticals	37	5	0	0	5	0	0
(11) Other chemicals	41	2	0	1	1	0	0
(12) Petroleum & coal products	20	2	0	0	1	50.00	0
(13) Plastic products	15	1	0	0	1	100.00	0
(14) Rubber products	27	2	1	0	1	50.00	0
(15) Ceramics	43	5	1	0	3	0	0
(16) Steel manufacturing	31	1	0	0	0	0	0
(17) Nonferrous metals	32	1	0	0	1	50.00	0
(18) Metal products	64	4	0	0	3	0	0
(19) Machinery	78	13	3	2	7	75.00	1
(20) Electrical machinery & appliances	13	6	0	1	4	53.85	0
(21) Communications/electronic/electric instrumentation	45	8	0	0	7	66.67	0
(22) Automobiles	21	3	1	0	1	87.50	0
(23) Other machinery for transport	19	2	0	0	1	33.33	0
(24) Precision machinery	12	1	0	0	2	100.00	0
(25) Other a/c. industries	25	1	0	0	1	100.00	0
(26) Transportation, communications & public utilities	11	1	0	1	0	0	0
(27) Other kinds of industries							

Exports - Number 3

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	84	9	6	59	8	2
Frequency (total value) / distribution ratio	837	84.00	9	10.71	7.14	70.24	2.38
(1) 1 - 5 billion yen	344	17	4	3	10	58.82	0
(2) 5 - 10 billion yen	177	10	2	0	7	70.00	0
(3) 10 - 50 billion yen	237	35	3	1	26	74.29	0
(4) 50 - 100 billion yen	45	13	0	1	10	76.92	1
(5) > 100 billion yen	34	9	0	1	6	66.67	1

A: Corporations that responded

B: Frequency (total value)

C: Patents

D: Know-how (technical guidance, etc.)

E: Designs, trademarks

F: Copyrights

G: Other

Exports - Number 4

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	40	0	0	8	32	0
Frequency (total value) / distribution ratio	837	40.00	0	0.00	20.00	80.00	0.00
(1) Agriculture, forestry, fisheries	7	0	0	0.00	0.00	0.00	0.00
(2) Mining	4	0	0	0.00	0.00	0.00	0.00
(3) Construction	87	2	0	0.00	0.00	100.00	0.00
(4) Food products	55	2	0	0.00	0.00	2	0.00
(5) Textiles	21	3	0	0.00	0.00	3	0.00
(6) Pulp and paper	15	0	0	0.00	0.00	0.00	0.00
(7) Publishing and printing	6	1	0	0.00	0.00	1	0.00
(8) General chemicals	63	1	0	0.00	0.00	1	0.00
(9) Oils and paints	13	0	0	0.00	0.00	0.00	0.00
(10) Pharmaceuticals	37	3	0	0.00	0.00	3	0.00
(11) Other chemicals	41	0	0	0.00	0.00	0.00	0.00
(12) Petroleum & coal products	20	2	0	0.00	50.00	1	0.00
(13) Plastic products	15	1	0	0.00	0.00	1	0.00
(14) Rubber products	8	0	0	0.00	0.00	0.00	0.00
(15) Ceramics	27	2	0	0.00	0.00	2	0.00
(16) Steel manufacturing	43	3	0	0.00	0.00	3	0.00
(17) Nonferrous metals	31	0	0	0.00	0.00	0.00	0.00
(18) Metal products	32	0	0	0.00	0.00	0.00	0.00
(19) Machinery	64	1	0	0.00	0.00	1	0.00
(20) Electrical machinery & appliances	78	5	0	0.00	20.00	4	0.00
(21) Communications/electronic/electric instrumentation	37	3	0	0.00	33.33	2	0.00
(22) Automobiles	45	3	0	0.00	33.33	2	0.00
(23) Other machinery for transport	21	3	0	0.00	66.67	1	0.00
(24) Precision machinery	19	2	0	0.00	0.00	2	0.00
(25) Other eng. industries	12	1	0	0.00	100.00	0	0.00
(26) Transportation, communications & public utilities	25	1	0	0.00	0.00	1	0.00
(27) Other kinds of industries	11	1	0	0.00	100.00	0	0.00

Exports - Number 4

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	40	0	0	8	32	0
Frequency (total value) / distribution ratio	837	40.00	0	0.00	20.00	80.00	0.00
(1) 1 - 5 billion yen	344	10	0	0.00	20.00	8	0.00
(2) 5 - 10 billion yen	177	7	0	0.00	14.29	6	0.00
(3) 10 - 50 billion yen	237	15	0	0.00	20.00	12	0.00
(4) 50 - 100 billion yen	45	3	0	0.00	33.33	2	0.00
(5) > 100 billion yen	34	5	0	0.00	20.00	4	0.00

A: Corporations that responded

B: Frequency (total value)

C: Patents

D: Know-how (technical guidance, etc.)

E: Designs, trademarks

F: Copyrights

G: Other

Exports - Number 5

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	7	0	0	2	1	4
Frequency (total value) / distribution ratio	837	7.00	0	0.00	0.00	14.29	57.14
(1) Agriculture, forestry, fisheries	7	0	0	0.00	0.00	0.00	0.00
(2) Mining	4	0	0	0.00	0.00	0.00	0.00
(3) Construction	87	0	0	0.00	0.00	0.00	0.00
(4) Food products	55	0	0	0.00	0.00	0.00	0.00
(5) Textiles	21	2	0	0.00	0.00	0.00	100.00
(6) Pulp and paper	15	0	0	0.00	0.00	0.00	0.00
(7) Publishing and printing	6	0	0	0.00	0.00	0.00	0.00
(8) General chemicals	63	0	0	0.00	0.00	0.00	0.00
(9) Oils and paints	13	0	0	0.00	0.00	0.00	0.00
(10) Pharmaceuticals	37	0	0	0.00	0.00	0.00	0.00
(11) Other chemicals	41	0	0	0.00	0.00	0.00	0.00
(12) Petroleum & coal products	20	0	0	0.00	0.00	0.00	0.00
(13) Plastic products	15	0	0	0.00	0.00	0.00	0.00
(14) Rubber products	8	0	0	0.00	0.00	0.00	0.00
(15) Ceramics	27	0	0	0.00	0.00	0.00	0.00
(16) Steel manufacturing	43	1	0	0.00	0.00	0.00	0.00
(17) Nonferrous metals	31	0	0	0.00	0.00	0.00	0.00
(18) Metal products	32	0	0	0.00	0.00	0.00	0.00
(19) Machinery	64	0	0	0.00	0.00	0.00	0.00
(20) Electrical machinery & appliances	78	1	0	0.00	0.00	0.00	100.00
(21) Communications/electronic/electric instrumentation	37	1	0	0.00	0.00	0.00	0.00
(22) Automobiles	45	0	0	0.00	0.00	0.00	0.00
(23) Other machinery for transport	21	0	0	0.00	0.00	0.00	0.00
(24) Precision machinery	19	1	0	0.00	0.00	0.00	100.00
(25) Other eng. industries	12	0	0	0.00	0.00	0.00	0.00
(26) Transportation, communications & public utilities	25	0	0	0.00	0.00	0.00	0.00
(27) Other kinds of industries	11	1	0	0.00	0.00	100.00	0.00

Exports - Number 5

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	7	0	0	2	1	4
Frequency (total value) / distribution ratio	837	7.00	0	0.00	0.00	14.29	57.14
(1) 1 - 5 billion yen	344	1	0	0.00	0.00	0.00	0.00
(2) 5 - 10 billion yen	177	2	0	0.00	0.00	0.00	100.00
(3) 10 - 50 billion yen	237	3	0	0.00	0.00	0.00	66.67
(4) 50 - 100 billion yen	45	0	0	0.00	0.00	0.00	0.00
(5) > 100 billion yen	34	1	0	0.00	0.00	0.00	0.00

A: Corporations that responded
 B: Frequency (total value)
 C: Patents
 D: Know-how (technical guidance, etc.)
 E: Designs, trademarks
 F: Copyrights
 G: Other

Imports - Number 1

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	351	188	146	8	2	7
Frequency (total value) / distribution ratio	837	351.00	188	146	41.60	2.28	1.99
(1) Agriculture, forestry, fisheries	7	1	0	1	100.00	0.00	0.00
(2) Mining	4	4	2	2	50.00	0.00	0.00
(3) Construction	87	19	8	11	57.89	0.00	0.00
(4) Food products	55	11	5	4	36.36	0.00	0.00
(5) Textiles	21	5	3	2	40.00	0.00	0.00
(6) Pulp and paper	15	2	1	1	50.00	0.00	0.00
(7) Publishing and printing	6	4	3	1	25.00	0.00	0.00
(8) General chemicals	63	29	17	11	37.93	3.45	0.00
(9) Oils and paints	13	9	2	7	77.78	0.00	0.00
(10) Pharmaceuticals	37	22	14	8	36.36	0.00	0.00
(11) Other chemicals	41	14	2	3	64.29	0.00	0.00
(12) Petroleum & coal products	20	9	4	3	33.33	11.11	14.29
(13) Plastic products	15	8	4	4	50.00	0.00	0.00
(14) Rubber products	8	5	3	2	40.00	0.00	0.00
(15) Ceramics	27	11	3	8	72.73	0.00	0.00
(16) Steel manufacturing	43	16	9	5	31.25	12.50	0.00
(17) Nonferrous metals	31	17	8	9	52.94	0.00	0.00
(18) Metal products	32	14	7	7	50.00	0.00	0.00
(19) Machinery	64	28	16	12	42.86	0.00	0.00
(20) Electrical machinery & appliances	78	40	30	10	25.00	0.00	0.00
(21) Communications/electronic/electric instrumentation	37	21	15	5	23.81	0.00	0.00
(22) Automobiles	45	26	12	12	46.15	0.00	0.00
(23) Other machinery for transport	21	12	5	7	58.33	0.00	0.00
(24) Precision machinery	19	11	9	0	0.00	9.09	0.00
(25) Other mfg. industries	12	5	3	2	40.00	0.00	0.00
(26) Transportation, communications & public utilities	25	3	1	1	33.33	0.00	0.00
(27) Other kinds of industries	11	5	2	2	40.00	20.00	33.33

Imports - Number 1

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	351	188	146	8	2	7
Frequency (total value) / distribution ratio	837	351.00	188	146	41.60	2.28	1.99
(1) 1 - 5 billion yen	344	110	58	45	40.91	3.64	1.82
(2) 5 - 10 billion yen	177	62	32	29	46.77	1.61	0.00
(3) 10 - 50 billion yen	237	133	72	56	42.11	0.75	3.01
(4) 50 - 100 billion yen	45	28	17	11	39.29	0.00	0.00
(5) > 100 billion yen	34	18	9	5	27.78	11.11	5.56

A: Corporations that responded
 B: Frequency (total value)
 C: Patents
 D: Know-how (technical guidance, etc.)
 E: Designs, trademarks
 F: Copyrights
 G: Other

Imports - Number 2

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	246	104	117	14	8	3
Frequency (total value) / distribution ratio	837	246.00	104	42.28	47.56	5.69	1.22
(1) Agriculture, forestry, fisheries	7	1	1	100.00	0	0	0
(2) Mining	4	4	1	25.00	50.00	0	0
(3) Construction	87	13	6	46.15	53.85	0	0
(4) Food products	55	11	3	27.27	63.64	0	0
(5) Textiles	21	4	2	50.00	50.00	0	0
(6) Pulp and paper	15	2	1	50.00	50.00	0	0
(7) Publishing and printing	6	4	1	25.00	75.00	0	0
(8) General chemicals	63	20	6	30.00	55.00	0	0
(9) Oils and paints	13	8	5	62.50	25.00	0	0
(10) Pharmaceuticals	37	15	6	40.00	46.67	0	0
(11) Other chemicals	41	11	8	72.73	13.33	0	0
(12) Petroleum & coal products	20	8	2	25.00	75.00	0	0
(13) Plastic products	15	6	4	66.67	33.33	0	0
(14) Rubber products	8	4	0	0.00	50.00	0	0
(15) Ceramics	27	7	6	85.71	14.29	0	0
(16) Steel manufacturing	43	11	4	36.36	63.64	0	0
(17) Nonferrous metals	31	11	7	63.64	36.36	0	0
(18) Metal products	32	6	4	66.67	33.33	0	0
(19) Machinery	64	19	8	42.11	57.89	0	0
(20) Electrical machinery & appliances	78	23	6	28.00	72.00	0	0
(21) Communications/electronic/electric instrumentation	37	14	5	35.71	64.29	0	0
(22) Automobiles	45	19	10	52.63	47.37	0	0
(23) Other machinery for transport	21	8	5	62.50	37.50	0	0
(24) Precision machinery	19	7	0	0.00	100.00	0	0
(25) Other eng. industries	12	3	2	66.67	33.33	0	0
(26) Transportation, communications & public utilities	25	3	1	33.33	66.67	0	0
(27) Other kinds of industries	11	4	0	0.00	25.00	0	25.00

Imports - Number 2

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	246	104	117	14	8	3
Frequency (total value) / distribution ratio	837	246.00	104	42.28	47.56	5.69	1.22
(1) 1 - 5 billion yen	344	67	27	40.30	44.78	7.46	2.99
(2) 5 - 10 billion yen	177	36	16	44.44	44.44	5.56	0.00
(3) 10 - 50 billion yen	237	99	44	44.44	48.48	5.05	1.01
(4) 50 - 100 billion yen	45	26	11	42.31	50.00	3.85	0.00
(5) > 100 billion yen	34	18	6	33.33	55.56	5.56	0.00

A: Corporations that responded

B: Frequency (total value)

C: Patents

D: Know-how (technical guidance, etc.)

E: Designs, trademarks

F: Copyrights

G: Other

Imports - Number 3

By type of industry	A	B	C	D	E	F	6
Corporations that responded	837	104	7	7	76	11	3
Frequency (total value) / distribution ratio	837	104.00	7	6.73	6.73	73.08	10.58
(1) Agriculture, forestry, fisheries	7	0	0	0	0	0	0
(2) Mining	4	0	0	0	0	0	0
(3) Construction	87	6	0	0	0	50.00	0
(4) Food products	55	6	1	0	6	100.00	0
(5) Textiles	21	3	0	0	5	83.33	0
(6) Pulp and paper	15	0	0	0	3	100.00	0
(7) Publishing and printing	6	2	0	0	0	0	0
(8) General chemicals	63	7	0	0	2	100.00	0
(9) Oils and paints	13	3	1	0	6	85.71	0
(10) Pharmaceuticals	37	5	0	0	2	66.67	0
(11) Other chemicals	41	3	0	1	5	100.00	0
(12) Petroleum & coal products	20	2	0	0	2	66.67	0
(13) Plastic products	15	1	0	0	1	50.00	0
(14) Rubber products	8	2	1	0	1	100.00	0
(15) Ceramics	27	2	0	0	2	50.00	0
(16) Steel manufacturing	43	7	1	0	5	71.43	0
(17) Nonferrous metals	31	2	0	0	1	50.00	0
(18) Metal products	64	4	0	0	1	75.00	0
(19) Machinery	78	13	1	1	8	85.71	1
(20) Electrical machinery & appliances	45	8	0	0	6	61.54	0
(21) Communications/electronic/electric instrumentation	37	6	0	2	4	66.67	0
(22) Automobiles	21	3	0	1	2	50.00	0
(23) Other machinery for transport	19	3	0	0	2	33.33	0
(24) Precision machinery	12	2	0	0	1	66.67	0
(25) Other mfg. industries	25	2	0	0	1	50.00	0
(26) Transportation, communications & public utilities	11	3	0	0	2	50.00	1
(27) Other kinds of industries						66.67	33.33

Imports - Number 3

By scale of capitalization	A	B	C	D	E	F	6
Corporations that responded	837	104	7	7	76	11	3
Frequency (total value) / distribution ratio	837	104.00	7	6.73	6.73	73.08	10.58
(1) 1 - 5 billion yen	344	22	3	3	14	63.64	0
(2) 5 - 10 billion yen	177	12	1	0	10	83.33	0
(3) 10 - 50 billion yen	237	44	2	1	36	81.82	1
(4) 50 - 100 billion yen	45	15	0	1	12	80.00	1
(5) > 100 billion yen	34	11	1	2	4	36.36	0

A: Corporations that responded

B: Frequency (total value)

C: Patents

D: Know-how (technical guidance, etc.)

E: Designs, trademarks

F: Copyrights

G: Other

Imports - Number 4

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	47	2	2	9	32	6
Frequency (total value) / distribution ratio	837	47.00	2	4.26	4.26	68.09	2
(1) Agriculture, forestry, fisheries	7	0	0	0.00	0.00	0	0
(2) Mining	4	0	0	0.00	0.00	0	0
(3) Construction	87	2	0	0.00	0.00	0	0
(4) Food products	55	2	0	0.00	0.00	2	0
(5) Textiles	21	3	0	0.00	0.00	2	0
(6) Pulp and paper	15	0	0	0.00	0.00	3	0
(7) Publishing and printing	6	1	0	0.00	0.00	0	0
(8) General chemicals	63	2	0	0.00	0.00	1	0
(9) Oils and paints	13	0	0	0.00	0.00	1	0
(10) Pharmaceuticals	37	3	0	0.00	0.00	3	0
(11) Other chemicals	41	0	0	0.00	0.00	0	0
(12) Petroleum & coal products	20	2	1	50.00	0.00	1	0
(13) Plastic products	15	1	0	0.00	0.00	1	0
(14) Rubber products	8	0	0	0.00	0.00	0	0
(15) Ceramics	27	2	0	0.00	0.00	0	0
(16) Steel manufacturing	43	4	0	0.00	0.00	2	0
(17) Nonferrous metals	31	1	0	0.00	0.00	3	0
(18) Metal products	32	1	0	0.00	0.00	1	0
(19) Machinery	64	0	0	0.00	0.00	0	0
(20) Electrical machinery & appliances	78	6	0	16.67	16.67	3	0
(21) Communications/electronic/instrumentation	37	4	0	0.00	0.00	3	1
(22) Automobiles	45	5	0	0.00	25.00	3	0
(23) Other machinery for transport	21	2	0	0.00	75.00	2	0
(24) Precision machinery	19	2	0	0.00	40.00	1	0
(25) Other mfg. industries	12	1	0	0.00	50.00	1	0
(26) Transportation, communications & public utilities	25	2	1	50.00	100.00	0	0
(27) Other kinds of industries	11	1	0	0.00	0.00	1	0

Imports - Number 4

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	47	2	2	9	32	6
Frequency (total value) / distribution ratio	837	47.00	2	4.26	4.26	68.09	2
(1) 1 - 5 billion yen	344	10	0	0.00	10.00	7	1
(2) 5 - 10 billion yen	177	7	0	0.00	14.29	6	0
(3) 10 - 50 billion yen	237	17	1	5.88	11.76	13	0
(4) 50 - 100 billion yen	45	5	0	0.00	40.00	3	0
(5) > 100 billion yen	34	8	1	12.50	37.50	3	1

A: Corporations that responded

B: Frequency (total value)

C: Patents

D: Know-how (technical guidance, etc.)

E: Designs, trademarks

F: Copyrights

G: Other

Imports - Number 5

By type of industry	A	B	C	D	E	F	G
Corporations that responded	837	8	0	0	3	0	5
Frequency (total value) / distribution ratio	837	8.00	0	0.00	3	37.50	62.50
(1) Agriculture, forestry, fisheries	7	0	0	0	0	0	0
(2) Mining	4	0	0	0	0	0	0
(3) Construction	87	0	0	0	0	0	0
(4) Food products	55	0	0	0	0	0	0
(5) Textiles	21	2	0	0	0	0	2
(6) Pulp and paper	15	0	0	0	0	0	0
(7) Publishing and printing	6	0	0	0	0	0	0
(8) General chemicals	63	0	0	0	0	0	0
(9) Oils and paints	13	0	0	0	0	0	0
(10) Pharmaceuticals	37	0	0	0	0	0	0
(11) Other chemicals	41	0	0	0	0	0	0
(12) Petroleum & coal products	20	0	0	0	0	0	0
(13) Plastic products	15	0	0	0	0	0	0
(14) Rubber products	8	0	0	0	0	0	0
(15) Ceramics	27	0	0	0	0	0	0
(16) Steel manufacturing	43	1	0	0	1	100.00	0
(17) Nonferrous metals	31	0	0	0	0	0	0
(18) Metal products	32	0	0	0	0	0	0
(19) Machinery	64	0	0	0	0	0	1
(20) Electrical machinery & appliances	78	1	0	0	0	0	0
(21) Communications/electronic/electric instrumentation	37	1	0	0	1	100.00	0
(22) Automobiles	45	0	0	0	0	0	0
(23) Other machinery for transport	21	0	0	0	0	0	0
(24) Precision machinery	19	1	0	0	0	0	1
(25) Other efg. industries	12	0	0	0	0	0	0
(26) Transportation, communications & public utilities	25	1	0	0	1	100.00	0
(27) Other kinds of industries	11	1	0	0	0	0	1

Imports - Number 5

By scale of capitalization	A	B	C	D	E	F	G
Corporations that responded	837	8	0	0	3	0	5
Frequency (total value) / distribution ratio	837	8.00	0	0.00	3	37.50	62.50
(1) 1 - 5 billion yen	344	1	0	0	0	0	1
(2) 5 - 10 billion yen	177	2	0	0	0	0	2
(3) 10 - 50 billion yen	237	3	0	0	1	0	2
(4) 50 - 100 billion yen	45	0	0	0	0	0	0
(5) > 100 billion yen	34	2	0	0	2	0	0

A: Corporations that responded

B: Frequency (total value)

C: Patents

D: Know-how (technical guidance, etc.)

E: Designs, trademarks

F: Copyrights

G: Other

V. Questionnaire

Management and Coordination Agency Approval No. _____

Recognized Time Limit: Until 31 August 1990

Survey Questionnaire on Research Activities by Private Corporations

This questionnaire will only be used for statistical purposes, so please fill it in with true information.

Science and Technology Policy Bureau, Science and Technology Agency

I. Please enter general information about your company below.

(3) Company Name _____

Name of person (Division and section names) _____

filling out (Your name) _____

questionnaire (Telephone number) _____

(4) Type of industry (Note 1) _____

(5) Capital (as of 31 March 1990) _____ x 100 million yen

(7) FY1989 sales _____ x 100 million yen

FY 1989 R&D expenditures (Note 2)

(12) Total _____ million yen

(13) Basic research expenditures _____ million yen

(14) Applied research expenditures _____ million yen

(15) Developmental research expenditures _____ million yen

Consumption tax accounting: ___ 1. After tax 2. Including tax

(16) Total number of employees (Note 3) _____ people

(17) Number of full-time researchers (Note 4) _____ people

(20) Foreign researchers among these (Note 5) _____ people

(18) Number of patents held (for technology that your company developed; number as of 31 March 1990) _____ patents

((19) Number of these that are held in foreign countries _____ patents)

Remarks (change of address, address report should be forwarded to, and any other information about how to make contact you)

Note 1) For the classification of the type of industry, select from the table below the type of industry that corresponds to the product items for which your company had the highest sales in FY1989, and enter that number.

Note 2) R&D expenditures means the total amount of R&D-related personnel expenses, materials costs, purchasing costs of tangible fixed assets, and other expenses. Enter the amounts of all the expenses pertaining to the following items:

Basic research

This means research that does not directly involve special application or use but is for the purpose of forming hypotheses and theories; or, theoretical or experimental research that is carried out for the purpose of gaining new knowledge about phenomena or observable facts.

Applied research

This means research that uses the knowledge discovered through basic research, establishes specific objectives, or ascertains the possibility of practical application of that knowledge; or, research that searches for new ways to adapt existing methods that have already been put to practical use.

Developmental research

This means research that introduces new materials, devices, products, systems, processes, etc., and that utilizes the knowledge gained from basic research, applied research, and actual experiments; or, research aimed at improving existing materials, devices, products, systems, processes, etc.

Note 3) Enter the total number of employees, executives, etc., that have been employed for at least one month.

Note 4) This means people who have complete university (excluding junior college) coursework (or those with at least an equivalent level of specialized knowledge) and who have at least two years of research experience; or, people who are carrying out research on special themes and have been employed for at least one month.

Note 5) Foreign researchers means researchers of nationalities other than Japanese who have an employment contract for at least one month and who are engaged in research activities; this does not include people engaged in the corporation's joint research, training, or other such activities (same as the previous year's survey). Other conditions are the same as in Note 4 above.

Note 6) Registered patents; does not include utility model, design, or trademark rights. Incidentally, this does not include patents for which the continuation period of patent rights has been exceeded (for Japan, 15 years after the date on which the application was announced.)

Also, "number of foreign patents held" means patents that are registered in countries outside of Japan; if the same patent is registered in several countries, this means the total number of patents in all of the individual countries.

Number Type of Industry

- 1 Agriculture, forestry, fisheries
- 2 Mining
- 3 Construction
- 4 Food products
- 5 Textiles
- 6 Pulp and paper
- 7 Publishing and printing
- 8 Fertilizers, inorganic and organic chemicals, synthetic fibers
- 9 Oils and paints
- 10 Pharmaceuticals
- 11 Chemical industries other than 8 - 10
- 12 Petroleum products & coal products
- 13 Plastic products
- 14 Rubber products
- 15 Ceramics
- 16 Steel and iron manufacturing%
- 17 Nonferrous metals
- 18 Metal products
- 19 Machinery
- 20 Electrical machinery & appliances
- 21 Communications, electronic & electric measuring instruments
- 22 Automobiles
- 23 Machinery for non-automotive transport use
- 24 Precision machinery
- 25 Manufacturing industries other than 4 - 24
- 26 Transportation, communications, & public utilities
- 27 Other kinds of industries

II. New Demands on R&D Activities

(1) Actively adapting to consumers from a social standpoint

Question 1. As changes occur in the structure of society, what is emphasized in your company's R&D policies for the 1990s? Circle up to two of the following numbers that correspond to your answers.

(21) # R&D Directions from the 1990s

1. Adapting to internationalization
2. Higher-tech technology
3. Adapting to the realization of an affluent way of life
4. Research exchange, with universities and national labs
5. Other

Question 2. Do you think that your company's technology is adequate for the realization of an affluent way of life in Japan? Circle one of the following numbers that corresponds to your answer.

(22) # Level of Technology Related to the People Lifestyle

1. Adequate
2. More or less adequate
3. Considerably inadequate
4. Other

We ask those who answered 2. or 3. :

Why is the level of your company's technology inadequate? Circle one of the following numbers that corresponds to your answer.

(23) # Reasons Why Technology Levels Are Inadequate

1. Not much need
2. Lack of specialized researchers
3. Difficulties in technology development
4. No problems in existing route
5. Other

Question 3. Even if superior technology is developed, do you think there are times when the social system becomes an obstacle in the utilization of technology? Circle one of the following numbers that corresponds to your answer.

(24) # Obstacles in Technology Utilization

1. Often
2. Sometimes
3. Seldom
4. Hardly ever

We ask those corporations that answered 1. or 2.:

Concretely, what causes those obstacles? Circle one of the following numbers that corresponds to your answer.

- (25) # Causes of Obstacles
1. Regulations
 2. Economy
 3. Differences in sense of values
 4. Lack of power in public relations
 5. Other

Question 4. Consumer needs are said to be continually changing. With respect to your company's major consumer-oriented products, how did the emphasis of your company's R&D change during the 1980s and then during the 1990s to adapt to consumer needs? Circle one number in each column that corresponds to your answer.

# <u>Changes in Consumer Needs</u>	(26) <u>1980s</u>	(27) <u>1990s</u>
1. R&D for cost reduction	1	1
2. Development for mass production	2	2
3. Development for multi-variety, small-volume production	3	3
4. R&D of high-value-added products	4	4
5. Hardly any change	5	5

Question 5. It is said that Japan is rapidly moving towards an aged society; is your company tackling the R&D of products that help to promote the participation in society of elderly and disabled people? Circle one of the following numbers that corresponds to your answer.

- (28) # R&D for Aiding the Elderly and Disabled
1. Are tackling it
 2. Are not tackling it
- (29) # Assisting Elderly and Disabled People
1. Walking, movement, and nursing aids
 2. Artificial bones and organs
 3. Medical examination and treatment equipment
 4. Health apparatuses and health food
 5. Other

Question 6. The health boom is said to be flourishing; is your company carrying out R&D that relates to health maintenance and promotion? Circle one of the following numbers that corresponds to your answer.

(30) # R&D For Health Maintenance and Promotion

1. Are carrying out
2. Are not carrying out

(31) # Areas of Health Maintenance and Promotion R&D

1. Health foods, health drinks
2. Health diagnostic equipment
3. Health maintenance and promotion apparatuses
4. Other

Question 7. In carrying out R&D, do you foresee home automation permeating any further into people's lifestyles? In this case, home automation means freely manipulating various household electrical devices through telephones and remote control to save on outside help. Circle one of the following numbers that corresponds to your answer.

(32) # Predicting the Spread of Home Automation

1. It is a big market
2. Cannot expect it to spread because of the small living quarters in Japan
3. It will be popular in special cases such as households where there are elderly people sleeping
4. Desire will wane because of consumer health indications
5. Does not pertain to our company
6. Other

(2) Improving Social and Urban Amenities

Question 8. Is your company tackling any special R&D for the purpose of increasing the safety and comfort of cities? Circle one of the following numbers that corresponds to your answer.

(33) # Urban Construction and Technology

1. Are carrying out
2. Are not carrying out

(34) # Areas of R&D for Urban Cultivation

1. Traffic system control and advanced information systems
2. Technology for building high-rise living spaces, utilization of deep underground spaces
3. Controlling exhaust gas and noise pollution, wastewater treatment, and waste treatment
4. Stable supply of energy and food
5. Preventing natural disasters
6. Other

Question 9. With garbage and waste processing becoming a problem, is your company conducting research related to methods of processing and re-using products after they are consumed? Circle one of the following numbers that corresponds to your answer.

(35) # Consideration Given to Environmental Preservation During Product Design

1. Research for all of our products
2. Research for some of our products
3. Little or no research at all
4. Other

We ask those corporations that answered 2. or 3.:
What does your company think about the disposal and re-use of your products? Circle one of the following numbers that corresponds to your answer.

(36) # Disposal and Re-Use of Products

1. Processing or re-utilization methods have already been established
2. Research on disposal and recycling should be done in our company
3. The firms that produced the raw materials should handle it
4. Our hands are full with research related to products or competitive strength
5. The government should develop the technology and take care of disposal (re-use)
6. Does not apply to our company
7. Other

(3) Carrying Out Public Contributions

Question 10. Does your company have exhibition halls, museums, or other such places related to S&T that are open to the general public? However, this does not include showrooms or other such places where the main objective is to display products. Circle one of the following numbers that corresponds to your answer.

(37) # Exhibition Halls, etc.

1. Do have
2. Do not have

(38) #

1. Concrete plans to set up such a place
2. Looking into setting up such a place
3. Not looking into setting up such a place

Answer the following about the content, opening year, and» yearly number of visitors to your company's exhibition halls, etc.

(39) # Contents of Exhibition Halls, etc.

1. About S&T history and new technology
2. About the company's technology
3. About the industry's technology
4. Other

(40) # Year of Opening

1. Before 1955
2. 1955-1965
3. 1965-1975
4. 1975-1985
5. Since 1985

(41) # Yearly Number of Visitors
(January - December 1989)

1. Less than 1,000
2. 1,001 - 5,000
3. 5,001 - 10,000
4. 10,000 - 50,000
5. 50,000 - 100,000
6. More than 100,000

Question 11. With the increasing demand for private corporations' social contributions, what does your company think about S&T-related donations to universities and support of academic societies, symposia, etc? Circle one of the following numbers that corresponds to your answer.

(42) # Support of Academic Societies, Etc.

1. It is a part of the company's social activities
2. It is a way of activating research through raising the consciousness of researchers
3. For the further development of the industry
4. It is a way of gathering information
5. It improves the company's image
6. We do not carry out such support
7. Other

Question 12. In order to strengthen your company's R&D power, from what kinds of technical fields do you intend to hire personnel? Circle one of the following numbers that corresponds to your answer.

(43) # Technical Fields

1. Information, electronics, software
2. Substances, materials, processing
3. Life sciences
4. Environmental preservation, pollution prevention
5. Lifestyle, education, cultureTraffic, transport
6. Traffic and transportation
7. Communications
8. Cities, construction
9. Humanities, social sciences
10. Other

Also, as the sources of personnel other than new graduates, what kind of people do you intend to hire? Circle one of the following numbers that corresponds to your answer.

(44) # Sources of Personnel

1. Male researchers
2. Female researchers
3. Foreign researchers
4. Do not consider sources other than new graduates
5. Other

Question 13. Does your company have special posts (organizations) that carry out research on the social impact (technology assessment) of a new product when it is being developed? Circle one of the following numbers that corresponds to your answer.

(45) # Development and Assessment of New Products

1. Have
2. Do not have

(We ask corporations involved with the life sciences the following question.)

Has your company ever taken bioethics into consideration during R&D? Also, do you think it will be taken into consideration in the future?

Incidentally, bioethics in this question means that which, together with brain death, organ transplants, and male and female divisions, influences the dignity of a human being, and the way of human beings' thinking and living.

(46) # Bioethical Considerations

1. Bioethics taken deeply into consideration
2. Sometimes taken into consideration
3. Not taken into consideration now but will be in the future
4. Bioethics does not pertain to the type of industry, so such problems will not occur
5. Other

(We asked corporations involved with the computers the following question.)

Computers are entering every nook and cranny of society. Does your company evaluate the impact of computers on society when you conduct R&D?

(47) # The Impact of Computers

1. A great impact, so we evaluate the effects of computers while we conduct our development
2. A great impact, but cannot say effects are negative
3. Not much impact at present stage
4. Impact is more positive than negative
5. Impact is little enough that it can be ignored, so we do not evaluate it
6. Other

Question 14. If your company has been involved with the following technologies, what is the level of your technology in comparison with that of other countries? For the item that applies, circle one of the numbers that corresponds to your answer.

(Selections)

1. Ahead of the U.S. and Europe
2. Same as the U.S. and Europe
3. Behind the U.S. and Europe

International Comparison of Technology

- | | | | | |
|---|------|---|---|---|
| 1. Well-being equipment for the elderly | (48) | 1 | 2 | 3 |
| 2. Methods for designing comfortable living spaces | (49) | 1 | 2 | 3 |
| 3. Household electrical products | (50) | 1 | 2 | 3 |
| 4. Information and communications equipment | (51) | 1 | 2 | 3 |
| 5. Public works and construction technology that takes disaster prevention and views into consideration | (52) | 1 | 2 | 3 |
| 6. Traffic and transportation control systems | (53) | 1 | 2 | 3 |
| 7. Technology for preventing environmental pollution | (54) | 1 | 2 | 3 |
| 8. Medical treatment equipment | (55) | 1 | 2 | 3 |
| 9. Evaluating the impact of the company's products on society | (56) | 1 | 2 | 3 |

III. State of Technology Trade

Question 1. In connection with technology trade in recent years, many cross-licensing contracts are said to have been signed. Enter the amount of your company's technology trade during FY1989, and the approximate percentage of technology trade that cross-licensing contracts account for when you estimate those amounts (i.e., the amount that your technology trade is reduced by as a result of cross licensing).

Amount of technology trade

Exports (amount received): _____ x 10,000 yen (57)

Imports (amount paid out): _____ x 10,000 yen (58)

Estimated amount of cross-licensing contracts (percentage of the sum of technology trade exports and imports): _____ % (59)

Question 2. In the statistics on technology trade, income and expenditures have stayed at about the same level over the past few years; with respect to new contracts, too, there have been deficits in FY1987 and FY1988. Circle the number that corresponds to the state of your company's technology trade. In the case where your company has a deficit for the entire company (i.e., both new undertakings and your regular line of business), circle one or two reasons for that deficit.

State of technology trade

- | | |
|---------------------------------|---------------------------|
| Entire company (60) | 1. Exports exceed imports |
| | 2. Balance |
| | 3. Imports exceed exports |
| Principal line of business (61) | 1. Exports exceed imports |
| | 2. Balance |
| | 3. Imports exceed exports |
| New undertakings (62) | 1. Exports exceed imports |
| | 2. Balance |
| | 3. Imports exceed exports |

(New undertakings in this question means new businesses outside of your company's principal business, in which your company has recently started making inroads or plans to make inroads.)

(63) # Reasons for Excess of Imports Over Exports in Technology Trade

1. Historically foreign countries have had the basic patents
2. Business restructuring
3. No room for basic research in our company
4. Due to tough competition from other domestic companies, we look overseas
5. Policy of basically not selling our technology to other companies
6. Price of overseas technology higher than Japan's
7. Recent appreciation of the Japanese yen
8. Other

Question 3. With respect to technology trade, in what order are the largest amounts of money paid or received for "patents," "know-how," "designs, trademarks," and "copyrights"?

Exports (64) Imports (65)

Patents
 Know-how
 (technical guidance, etc.)
 Designs, trademarks
 Copyrights
 Other ()

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